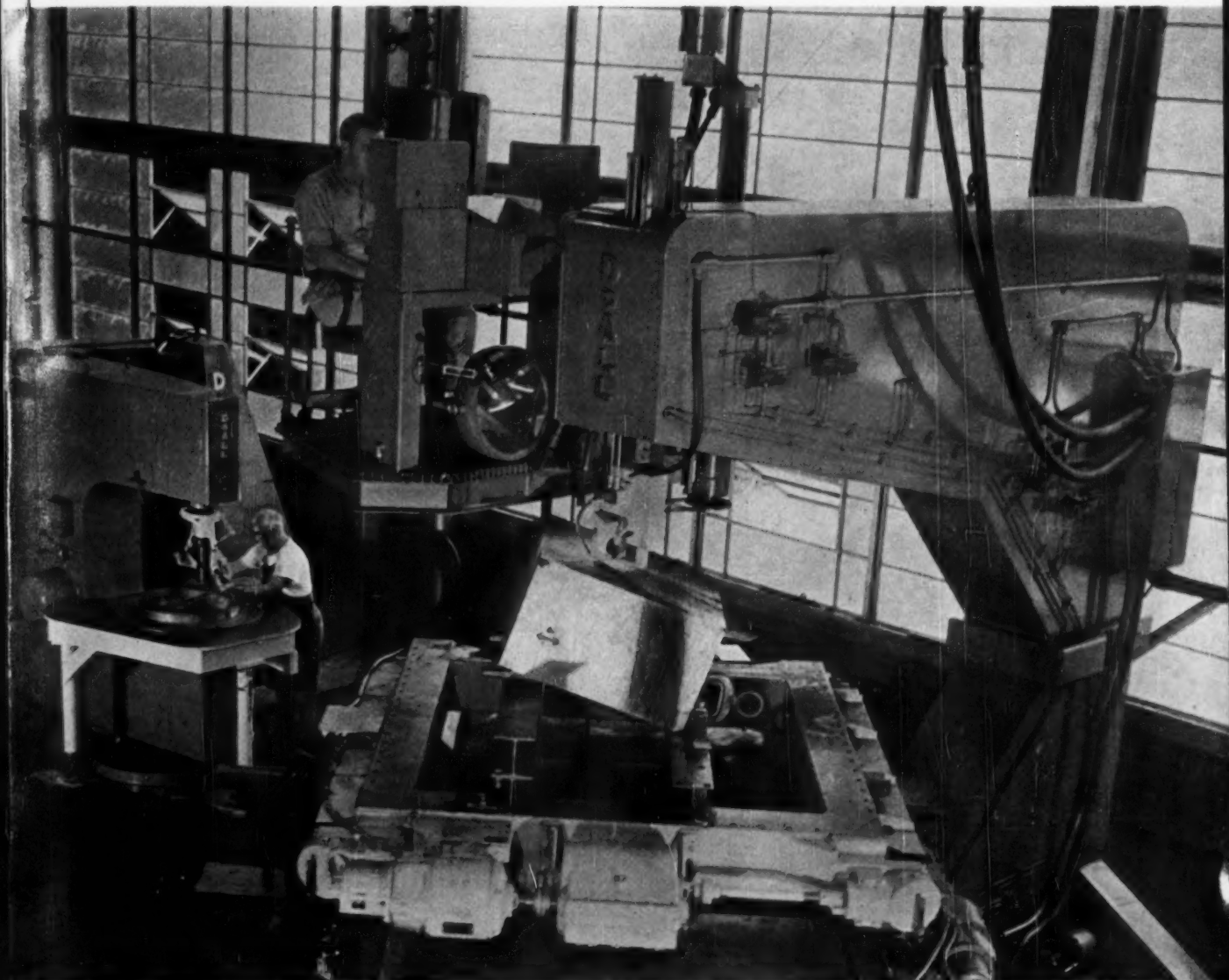


# The IRON AGE

April 30, 1959

A Chilton Publication

The National Metalworking Weekly



Special Report to Management:

**How to Get More  
For Your Tool Steel  
Dollar P. 109**

**Can a Strike  
Be Averted in Steel? – P. 71**

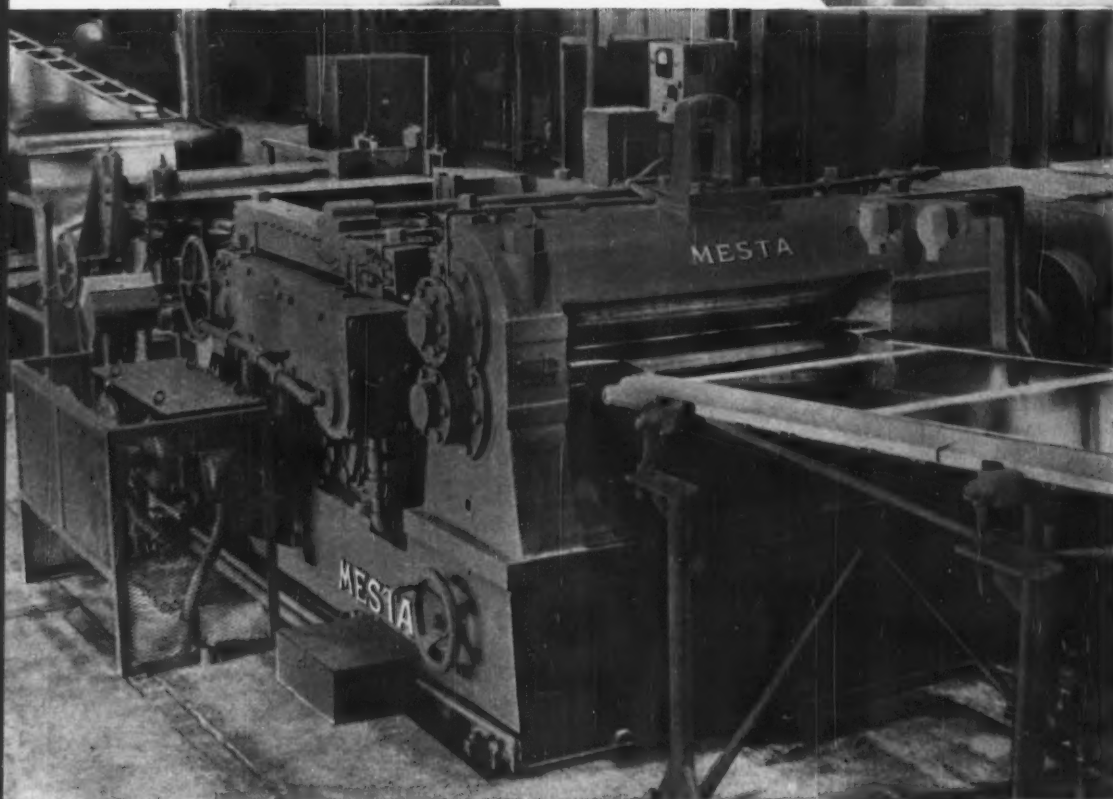
**Seaway Poses  
New Import Threat – P. 76**

**Digest of the Week – P. 2-3**

# Shearing\*

## LINES

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MESTA 42" High Speed Rotary Flying Shear and Leveller shearing tin plate at 1,200 ft. per minute on an Electrolytic Tinning Line at Tennessee Coal & Iron Division of United States Steel Corporation

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Chestnut and 56th Sts.  
Philadelphia 39, Pa., SH 8-2000  
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Indexed in Applied Science & Technology Index and Engineering Index.



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THE IRON AGE, published every Thursday by CHILTON COMPANY, Chestnut & 56th Sts., Philadelphia 39, Pa. Second class postage paid at Philadelphia, Pa. Price to the metalworking industries only or to people actively engaged therein, \$5 for 1 year, \$8 for 2 years in the United States, its territories and Canada. All others \$15 for 1 year; other Western Hemisphere countries, \$20; other Foreign Countries, \$35 per year. Single Copies 50¢. Annual Review Issue \$2.00. Cable: "Ironage," Philadelphia.

# The IRON AGE

April 30, 1959—Vol. 183, No. 18

## Digest of the Week in

\*Starred items are digested at right.

### EDITORIAL

The Steel Labor Hassle: Its Outcome Will be Decisive... 7

### NEWS OF INDUSTRY

\*Special Report: Senate Hearing Uncovers Gloom in Labor Crisis... 71  
\*Call for Sanity in Steel Buying... 73  
\*Screw Machine Shops Booming... 74  
World Will Use More Zinc... 75  
\*Seaway Not an Unmixed Blessing... 76  
\*Tin at Stake in Bolivian Crisis... 78  
Foreign Aid Spending... 79  
The IRON AGE Salutes... 83  
Men in Metalworking... 98

### FEATURE ARTICLE

\*How to Get More For Your Tool Steels Dollar... 109

### NEWS ANALYSIS

Newsfront... 9  
Report to Management... 85  
\*Automotive... 87  
\*Washington... 91  
\*West Coast... 93  
Machine Tools... 95

### MARKETS & PRICES

Market Planning Digest... 69  
\*The IRON AGE Summary... 145  
\*Purchasing... 146  
Steel Product Markets... 148  
Index to Prices... 149  
Iron and Steel Scrap Markets... 150  
Nonferrous Markets... 154  
Clearing House... 166

### REGULAR DEPARTMENTS

Letters... 11  
Fatigue Cracks... 13  
Coming Exhibits, Meetings... 15  
Industrial Briefs... 96  
Free Literature... 126  
New Materials, Components... 141  
New Equipment... 142

INDEX TO ADVERTISERS... 170

### NEWS ARTICLES

#### STEEL LABOR CRISIS

**Gloomy Outlook**—Steel labor and management hold firm to their positions as steel labor contract



talks near. Senate hearing testimony underscores gloomy outlook. P. 71

#### ST. LAWRENCE SEAWAY

**A Mixed Blessing?**—The seaway will help U. S. industry by enlarging world market potential for many companies. But it will also sharpen competition of foreign companies in U. S. P. 76

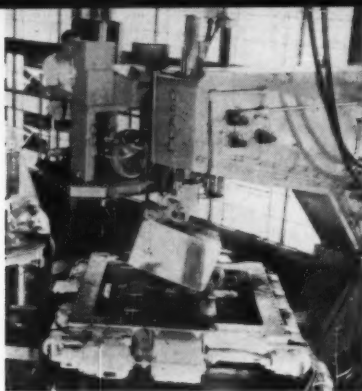
#### HIGHWAY RADIO

**New Control Setup**—Highway officials are being sounded out on a new, low frequency radio system for traffic control. Units would transmit warnings, road conditions, etc. to passing cars. P. 87

#### DEFENSE MONEY

**Surplus Is Possible**—It now appears Congress will vote more ICBM money than the Defense Dept. has asked for. Mr. McElroy

# Metalworking



## TOOL STEEL IN PROCESS:

Giant DoAll band machine cuts tool steel die block at ALCOA plant. This week's How to Get More for Your Metalworking Dollar series covers how to select the most appropriate tool steel for a given job. DoAll Co. Photo. P. 109

may hold surplus in reserve. P. 91

## MISSILE COSTS

**How They Rise**—Missile weapons systems will keep on getting more expensive. And for every dollar spent on the weapons themselves, two dollars go for equipment to arm, fuel, test, launch, and track them. P. 93

## FEATURE ARTICLE

### HOW TO GET MORE FOR YOUR TOOL STEELS DOLLAR

**Water Hardening Steels**—With little or no alloy content, water hardening tool steels are low in cost. They can be machined with ease. In the heat treated condition they provide a hard surface and a tough core. P. 110

**Shock Resisting Grades**—These steels are of either low or intermediate alloy types. Principal alloying combinations include manganese-silicon, silicon-molybdenum, chromium-tungsten. P. 111

**Cold Work Steels**—There are three general types of cold work tool steels. All of them have a high carbon content, ranging from 0.090 to over 2.00 pct. Choice depends on specific application. P. 113

**Hot Work Steels**—Not only are they strong, but hot work steels retain their strength at high temperatures. Their unusual properties make them candidates for missile

casings, special machine parts, or hot working dies. P. 114

**High Speed Steels**—Most are rich in alloy to withstand the wear and tear of metal-cutting operations. They are usually of the tungsten or moly base types. P. 116

**Special Purpose Steels**—Among the list of special purpose tool steels are mold steels and nickel containing alloys. P. 118

## TOOL STEEL DIRECTORY

**Cross Index of Brands**—Classified by producer or distributor, comparable tool steel brands are listed under American Iron and Steel Institute symbols. P. 119

## MARKETS & PRICES

### STEEL BUYING

**Call for Sanity**—In spite of the strike threat, there is no need for extremes in steel inventory policy, says U. S. Steel executive. He says inventory excesses hurt both users and mills. P. 73

## NEXT WEEK

### INSPECTION COSTS

**Evaluate Vendors**—Next week's special report tells how a large appliance maker slashed its cost of inspecting purchased parts and materials. It's done through a systematic evaluation of vendor performance.

## SCREW MACHINE SHOPS

**Picture Is Bright**—Independent operators got together in New York and found that this year may be the best ever; and they probably weathered the recession better than captive shops. P. 74

## BOLIVIAN TIN

**Lower Export Level**—Economic chaos and political upheavals have taken a toll on Boliva's tin industry. Present government hopes to stabilize tin and develop other exports. P. 78

## STEEL MARKET

**It's Better Than It Looks**—More steel men are coming around to the belief that steel demand is basically strong. The strike threat is not the whole story. P. 145

## SHOP EQUIPMENT

**Research Aids Sales**—Researcher-designers are key men on staffs of shop equipment makers. Their knowhow on customer needs, product trends, materials, and color pays off in sales. P. 146







## Get new-forging performance at 1/3 the cost from ERIE FOUNDRY REBUILDING SERVICE

Here at the Erie Foundry Rebuilding "Hospital", we disassemble and inspect your forging hammer, remachine worn surfaces, true bearings, replace broken parts, repair cracked parts. Once the hammer is reassembled, tested and put back in operation, it'll be as spry and sound as a new machine—but at one-third the cost!

Stands to reason that the leaders in forge manufacture for over 60 years should be the best source for forge repair.

Regardless of who made it, or how badly it's cracked, broken or worn, your forging hammer will recover most quickly at Erie Foundry's Rebuilding "Hospital". Write for the complete story.



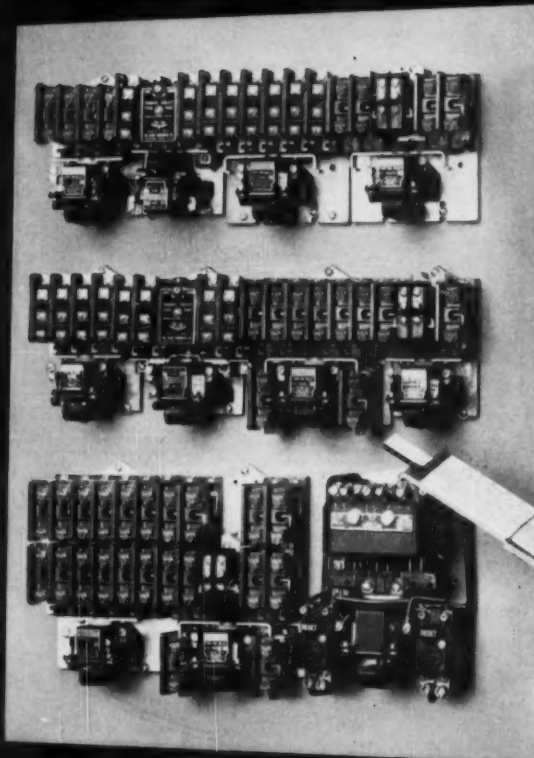
THE WORLD'S GREATEST NAME  
IN FORGING SINCE 1895

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EP-89-02

THE IRON AGE, April 30, 1959

WHY SPACE IS  
FRONT-PAGE NEWS...



## Compact Clark Relays control 72 circuits from panel area smaller than a newspaper

In this day of space exploration and space economy, it's news—front page news—when you can get 72 separate, controlled circuits all on a panel no larger than 15" x 20".

Clark Controller, with the most complete and integrated line of control relays available today—convertible pole, latch, universal pole, and time delay—does it! And only Clark offers such a wide range of operation, so many contacts, in a panel area of such small size.

Shown mounted here with the Clark Size 1, Type "CY" Starter are 10 compact Clark Relays which include four time delay contacts (two normally open, two normally closed), 52 instantaneous contacts (14 normally open, 14 nor-

mally closed, and 24 convertible), plus 16 latching contacts (all convertible).

The same engineering leadership and superior workmanship that made Clark Controller the *standard of quality* for controls in heavy industry, is inherent in the broad line of Clark Relays for modern panels.

The "modular construction" of all Clark "PM" Relays insures integrated uniformity, compactness and flexibility. Functional alignment in mounting

results in neater, more uniform panels and most efficient utilization of valuable space. And because "PM" relays are available in a wide variety of pole combinations, providing up to 14 contacts on a single relay, you can control more circuits—save on relay requirements.

For more information on the complete line of Clark "PM" Relays which is making space-saving headlines, contact your nearest Clark Controller sales office or distributor. Or, write direct to Clark Controller for free bulletins.



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and Sharonart\* combine  
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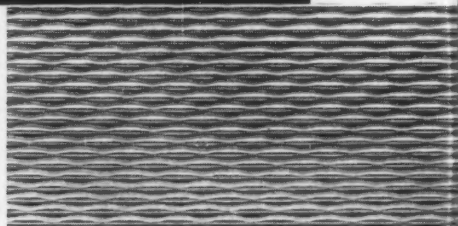
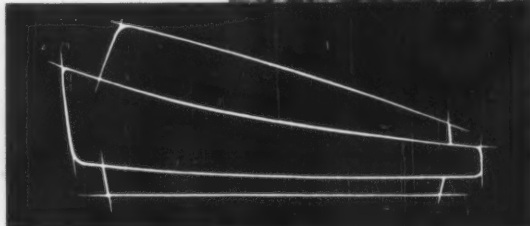
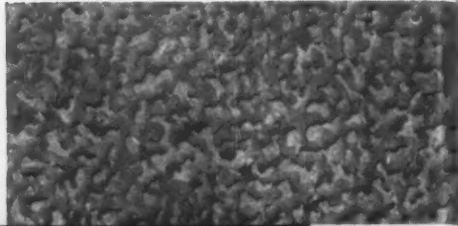
*Peter Schladermundt, A.I.A., A.S.I.D., P.D.C., for 25 years a leading designer of many of America's foremost industrial products. Formerly associated with Norman Bel Geddes and other designers and architects on such projects as General Motors "FUTURAMA" and the design of Rockefeller Centre.*

Tomorrow's business machines will have the low, sleek profile and functional beauty you see in this type-writer design created by the nationally known industrial designer Peter Schladermundt especially for the Sharon Steel Corporation

The most important aspect of the design is the functional use of Sharonart\*, Sharon's popular patterned steel. By fashioning the work areas of Sharonart\* the usual marks of wear never show, and by forming the cover of this amazing metal many styles are immediately available to the manufacturer by simply changing the pattern . . . and here, too, wear is practically eliminated.

It's the kind of forward thinking that has made Sharonart the most popular material of its kind. Literature and information available from the Sharon salesman in your area by writing direct to Sharon Steel Corporation, Sharon Pa.

\*TM Sharon Steel Corporation



**SHARONSTEEL** *SHARON Quality STEEL*



# The Steel Labor Hassle

## Its Outcome Will Be Decisive

The biggest and most important show in years opens—officially—next week. Labor and steel management people will sit down to make final collective bargaining plans. Advance puffs on this show already have been set off by labor, management and by the Administration.

Both the union and the steel firms are meeting with a pistol at their heads. That gun is being held by the Administration—and by some Senators. Also, there are many business people and other citizens who—rightly or wrongly—think the “government” should be in the act.

The steel labor hassle this year is more significant than in other years. The end results will shape future union and labor policies. Also, we will know for sure how far “government” is willing to go in attempting to stem inflation.

It may be too late to adequately get across to government people that in demanding a “forced” agreement they may be chipping away at industrial freedom. When such freedoms are trampled—no matter how lightly—individual freedoms are next in line. The union should realize this—and so should friends of labor in government.

Cold facts suggest that steel wages are high

enough now. About the only argument—and it is a weak one—available to the steel union is that workers have “earned” productivity raises and the steel firms can “afford” to pay more.

Steel firms cannot, within the law, freeze prices. But anyone with an ounce of sense knows that if wages are frozen in the steel industry, there will be no price increases. Any view to the contrary is rather stupid.

The Administration is willing to go to great lengths to stem inflation. There is no argument here that inflation isn't our number one enemy. In its zeal to get this point across, the Administration has hobbled steel firms by making it almost impossible to raise prices. To steel people that means wages can't go up: Or if they go up, part of the increase must be passed on in higher prices. If that happens, steel firms are in the soup for protecting their stockholders and their investment—as well as their future needs.

It will be some weeks before labor and management get down to brass tacks. It may be longer than that before labor realizes steel firms are attempting to do what the unions won't do—and what “government” refuses to do:

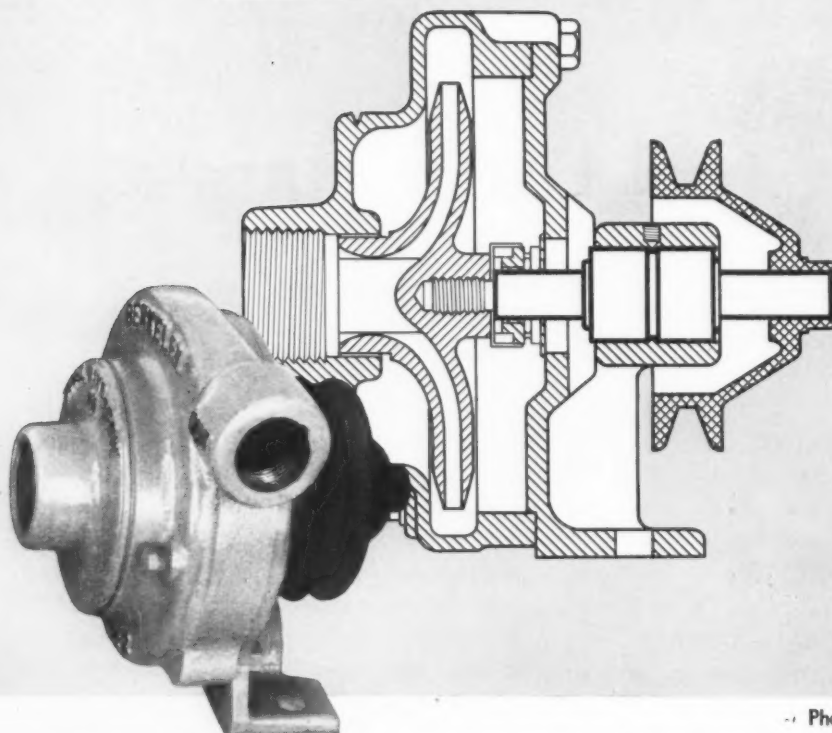
Stem the inflationary spiral!

*Tom Campbell*

Editor-in-Chief



## CASE HISTORIES



Compact integral shaft and bearing unit eliminates parts —cuts assembly time.

Photo: Courtesy Berkeley Pump Co.

### **N/D Ball Bearings Help Cut Size... Lower Costs \$2.50 Per Pump!**

#### **CUSTOMER PROBLEM:**

Redesign utility water pump for Air Conditioner market. Conversion must achieve smaller size without reducing pump capacity. At the same time, customer must lower over-all production costs.

#### **SOLUTION:**

N/D Sales Engineer suggested the versatile New Departure fan and pumpshaft ball bearing. This compact precision bearing permitted use of over-the-housing pulleys with belt load located over the raceway. Its integral shaft, which is the

inner race, simplified design and helped reduce housing size without changing pump capacity. In addition, the sealed and lubricated-for-life bearing replaced two sealed bearings, separate shaft and snap rings . . . cutting part and assembly-time costs \$2.50 per pump.

Perhaps one of New Departure's wide selection of *production* ball bearings will help give *your* product the sales appeal and cost savings you're looking for. For more information, call the New Departure Sales Engineer in your area or write Dept. S-4.



Replacement ball bearings available through United Motors System and its Independent Bearing Distributors

**NEW DEPARTURE**

DIVISION OF GENERAL MOTORS, BRISTOL, CONN.

NOTHING ROLLS LIKE A BALL

## Light-Weight Fiber Metal

In a new process, thin fibers of metal are interlocked like a felt cloth and bonded together with heat to produce a material of reduced weight at little sacrifice of strength. A finished part may look, feel, and act like a solid metal sheet, but actually be 90 pct air. It suggests a variety of aircraft and missile applications. Another type may have high density and still be highly and uniformly porous, suggesting use as a filter for both liquids and gases.

## Ceramic Permanent Magnets

Ceramic permanent magnets show promise as a replacement for use as torque couplings. Sintered barium-ferrite magnets are said to be smaller in size, easier to fabricate and less expensive than permanent magnet steels. Electrical manufacturers also see them for use in electric motors since they don't require critical raw materials such as cobalt or nickel.

## Compressed-Air Breakwater

Compressed-air breakwaters have been built and are now operating successfully. System of offshore submarine pipes release compressed air to water surface. Rising bubbles reduce heavy dangerous waves to lighter ones.

## Brazing with Powder Metal

Thin wafers of molded metal powder and brazing flux provide a good bond for ceramic tool bits, according to test reports. The process uses both heat and pressure. It appears simpler and neater than hand brazing techniques. It's said to give high joint hardness, even diffusion and good shock resistance.

## Foreign Aid Still a Must

Foreign aid is more important than ever, despite great improvements in long-range missiles, military men are telling Congress. Not only must we continue to operate overseas air bases, but

we must also pay the bills for a large percentage of the free world's armies, Congress hears. When will the need stop? Not in the foreseeable future, Defense Department insists.

## Moderate Cuts in Spending

Ike's drive for moderate cuts in federal spending is gaining. In addition to demands for economy in his speeches, he's been writing personnel letters urging business men, workers, and housewives to insist Congress hold down spending. One point seems to have struck a spark of public protest: Deficit spending in times of rising income brings on big inflation.

## Plastic Piston Rings

Self-lubricating plastic piston rings for compressors are outlasting conventional cast iron rings by 20 times. A single ring takes the place of four of its metal counterparts. Operating pressures can be up to 4500 psi at temperatures to 500°F.

## Lead for Sound Barriers

Lead sound barriers are being developed of less weight than other acoustical materials needed to achieve similar noise reduction levels. Lead coated fabric is already used for this purpose in one aircraft, and research for other applications is being pushed.

## Screw-in Fluorescent Lamp

Requiring no external ballast or starter, a new development in fluorescent lamps can be burned in an ordinary light socket. An incandescent filament eliminates the need for external inductor ballast and also emits light, adding to the total lumen output of the lamp.

## Grinding Miniature Parts

In attacking the problem of machining miniature bearings, a machine tool builder has adapted the shoe-type centerless principle to the job of efficiently handling parts with inside diameters as small as 0.040 in. The grinder has automatic loading, part sizing and ejection, plus simplified tooling for easy changeover.



# Fast new Signode heavy-duty tool

*at least*  
**Saves this much**  
**strapping**



**every time it's used**

The FN-114 is the first air power feed wheel heavy-duty tensioning tool. It is fast and easy to use. In addition to saving time, it eliminates waste in the curl of strap which, until now, has been a necessary evil in applying 1 1/4-inch strapping with windlass type tools.

Additional savings come from the fact that the FN-114 takes strapping directly from the dispenser—takes out all the slack *before* the strapping is cut off by a quick stroke of the handle.

The FN-114—like other Signode heavy-duty tools—is available on an annual rental or single payment basis. Let us arrange a demonstration on your premises at your convenience. Just write or call. No obligation.



Air power tensions 1 1/4" strapping fast, pulls as much as 3000 pounds of pre-set tension every time. Feed wheel permits unlimited take-up of slack.



The powerful FN-114 holds the tension in the strapping while the operator applies the seal, using a Signode Model C tool. Signode heavy duty air-powered sealers are also available.



New 1 1/4" seal has open flange to permit fast, easy placement. This seal or regular thread-on seal can be lithographed with your company name, trademark, and colors.



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## LETTERS FROM READERS

### Tax Revolt

**Sir**—Your "Taxpapers' Revolt" (Feb. 19 editorial) is very timely. Will you join us in promoting one single, united front, national movement for Americanism?

I find that after waiting over 10 years for someone else to do it, that you and I with the aid of all clear thinking taxpayers should actively support Mr. Cross in his "tax revolt."—W. C. Benchoff, San Leandro, Calif.

■ E. G. Cross, 207 East Main, Ritzville, Washington, is the man who started the "tax revolt" last February. He urges petitions to government officials demanding that government live within its means. Why not write him and join the "revolt."—Ed.

### Overseas Minds

**Sir**—In the article "You Can Use Overseas Research" (April 9) it is suggested that American industry go abroad for the performance of some of its research.

In answer to this, the following story seems appropriate. Walter Reuther, while being shown through an automated automobile plant, was challenged by his guide to collect union dues from the equipment. In answer he said, "Try to sell autos to the machines." The point is obvious.

If any industrial firms are really in need of scientific assistance, I suggest they contact the Denver Research Institute, an organization with which I am associated.

As for the shortage of scientific and engineering personnel, I think a survey of any laboratory will reveal there are professionals who are performing tasks beneath their ability and training which might well be performed by a high school graduate. They may also be flooded with paper work.

Another loss in professional personnel is the result of higher salaries paid to individuals performing management functions which lure scientists and engineers from the laboratory.

As a final point, the solution to any real shortage of scientists and engineers lies at the college level. If industry is really concerned, financial contributions for the support of colleges and universities (particularly the privately endowed) will increase the quality and quantity of available graduates. After all, industry is a major beneficiary of scientific and engineering training.—H. P. Leighly, Jr., Chairman, Dept. of Metallurgy, University of Denver, Denver, Colo.

### Double Header

**Sir**—Would you let us know if we can get reprints of these articles in the Apr. 9 issue:

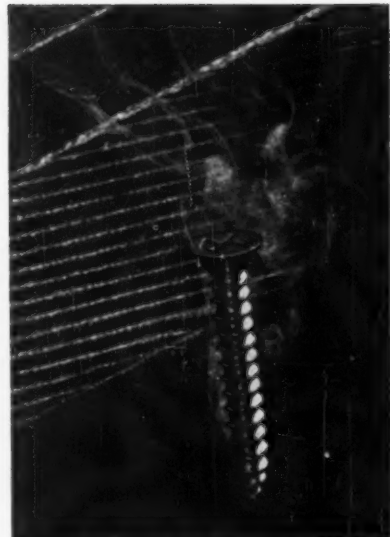
"How to Buy Special Machines" and "Numerical Control Takes on Transfer Machining."

These articles would prove invaluable as classroom material in our curriculum at General Motors Institute.—N. F. Snyder, Supervisor, Tool Engineering, General Motors Inst., Flint, Mich.

■ Reprints are on the way.—Ed.



"Was he expecting you?"



IN FASTENERS  
SOUTHERN IS  
**capacity**

Southern Screw's capacity to manufacture over 16,000,000 fasteners per day takes care of a lot of orders. Southern prides itself, too, on its capacity to expedite small to medium quantity orders with the same care with which large orders are handled.

You are invited to sample Southern Screw's capacity to serve you to your complete satisfaction with fasteners of highest quality. Write for Southern's current Stock List. Address Southern Screw Company, Box 1360, Statesville, North Carolina.

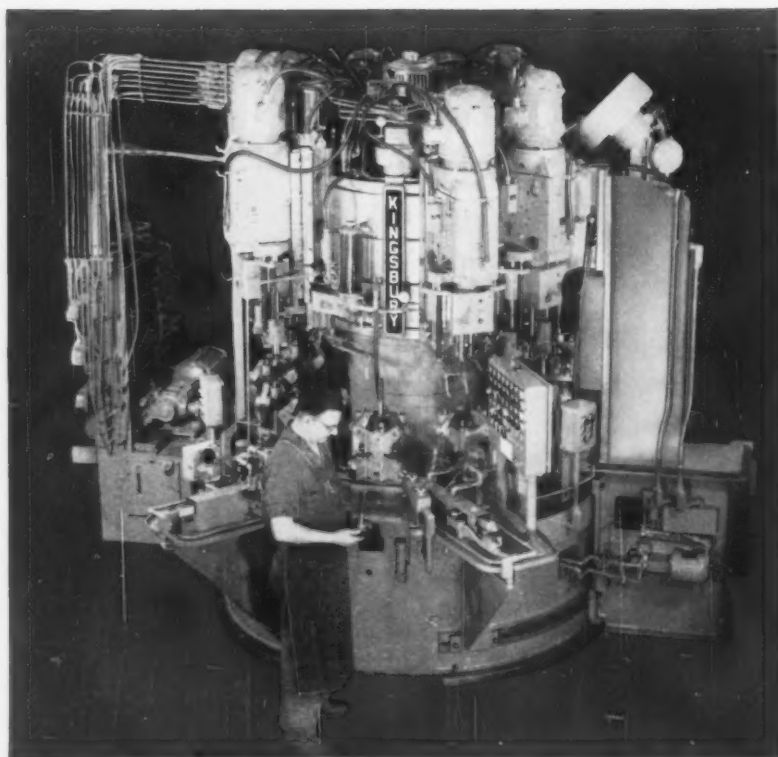
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Machine Screws & Nuts • Stove  
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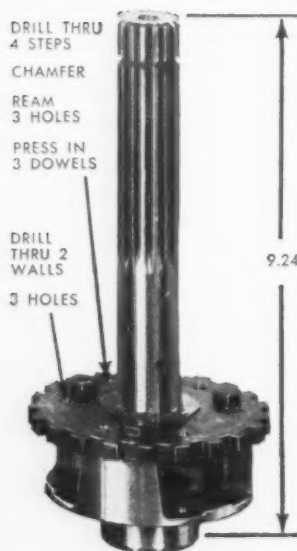
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## New 24-spindle Kingsbury has hydraulic slides, dowel presser



STEEL SHAFT ASSEMBLY FOR AUTOMATIC TRANSMISSION

At a gross rate of 210 parts an hour, eight vertical 3-spindle units on the center column operate on this shaft. To clear the stem of the work as it indexes, hydraulic slides raise these units 5.5 inches from their operating positions. The movement takes one second each way and has a smooth harmonic motion. Cams in the units feed the tools 2.7 to 3.5 inches more as required.

A dowel pressing unit is at the right. The operator loads dowels into the hopper at the top. Three dowels are fed down different tubes and are pressed into the work. At the previous station the work is washed clean of chips.

A 63-inch index table holds 12 work fixtures with power clamping and unclamping.

*Real production without trouble.* Production men praise our machines because they really produce and give little trouble. The main reasons are good basic design and rugged, accurate construction. If you have a job for a multi-unit automatic and can't afford to live with it day after day to make it work, consider a Kingsbury. It will pay off. Kingsbury Machine Tool Corp., Keene, New Hampshire.

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AUTOMATICS

## Kingsburys make money on simple jobs too



DRILL AND TAP  
2 HOLES - 90° APART  
PUMP PULLEY FOR  
AUTOMATIC WASHER

This simple machine makes money for the Maytag Co. by producing at a gross rate of 590 parts per hour with almost no downtime or rejects.

A 15-inch index table holds four work fixtures with manual clamping and unclamping. Four horizontal units drill and tap two holes. Bushings guide the drills for accuracy.

## Typical Kingsbury jobs in eleven industries



These parts are used in a ball bearing, automatic transmission, door set, engine, generator, air conditioner, electric shaver, valve, aircraft engine, control instrument and rifle. All cost less on Kingsburys.

### 20 Distributors

|         |   |                                       |
|---------|---|---------------------------------------|
| EAST    | Hartford 7                                | O C Stevens Mch Co                    |
|         | Long Island City 1                        | Triplex Mach Tool Co                  |
|         | Philadelphia 6                            | John S Wright Mch                     |
|         | Syracuse 1, Buffalo 23, Rochester 4,      | Syracuse Supply Co                    |
| MIDWEST | Schenectady 2                             | E A Kinsey Co                         |
|         | Cincinnati 2                              | Chicago 31, Milwaukee 8               |
|         | Cleveland 3, Toledo 13                    | Golden & McCoy                        |
|         | Dayton 2                                  | C H Gosiger Mch Co                    |
| SOUTH   | Detroit 19                                | Birmingham & Conner Mch               |
|         | Grand Rapids 4                            | Joseph Monahan Co                     |
|         | Indianapolis 20                           | C C Garrett Mch                       |
|         | Pittsburgh 37                             | Merit Mch Co                          |
| WEST    | St. Louis 24, Kansas City, Mo., Wichita,  | Four States Mch Co                    |
|         | Tulsa                                     | Robert R Stephens Mch Co              |
|         | Atlanta 6                                 | J R Walraven                          |
|         | Charlotte 5                               | Geo A Marshall Mch                    |
| CANADA  | Houston 13                                | Weissdorf Neime & Co                  |
|         | Denver 16                                 | Mine & Smelter Supply Co              |
|         | Los Angeles 22, Berkeley 10, San Diego 3, | San Jose, Scottsdale, Ariz. Moore Mch |
|         | Spokane 8                                 | W R Matthews Mch & Tool Co            |
|         | Toronto 8                                 | Barker Industrial Equip Ltd           |



## FATIGUE CRACKS

### All About Giants

Even 10-ton extrusion dies are fair game for the giant machines shown on our cover. That's because these huge DoALL company band saw and filers have been built to dwarf previous machines in size and machining ability. At work in Alcoa's aluminum extrusion plant at Lafayette, Ind., they are key machine tools in the Air Force "Heavy Press Program."

Such goliath tools are fitting choices to introduce this week's feature article on "How to Get More for Your Tool Steels Dollar." Tool steels cover a large territory both metallurgically and in terms of their industrial applications.

In the article which begins on p. 109 you'll find a complete run-down on high speed steels, intermediate alloys, and low alloy grades. Discussed are the metallurgy, heat treatment, and principal applications for the major groups of materials.

### Never-Never Land

Thousands of quotes originate in our nation's capital. But, according to the Roll Call, Capitol Hill newspaper, these are some things we'll never hear in Washington:

"Of course I expect to answer all of your questions, Senator McClellan."

"But senator, our agency doesn't want more money. This budget we're submitting is more than enough for our needs."

"Sorry, I'd like to hire you but it wouldn't look good for a congressman to have his wife on the payroll."

"Senator Symington, we in the Administration are grateful for your kind words on our defense program."

"Oh, come on, Senator Humphrey, can't we coax you into saying a few words?"

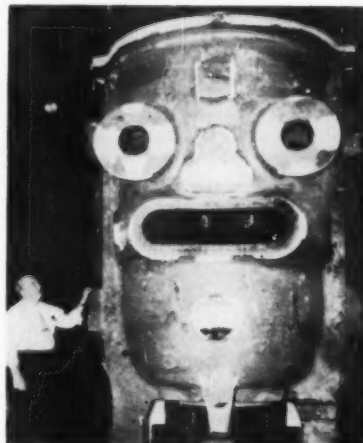
"I said it when I was in the White House and I say it now in Independence—the newspaper editors of the U. S. do a wonderful, fair and effective job."

"I told you when you were over in the Treasury and I tell you the same thing now, George: I'm not interested in balancing the budget."

"All right, Senator Goldwater, you've convinced me of what a great guy Walter Reuther is."

### Metal Idol?

While we're in a king-size frame of mind we might as well get around to this metal what-is-it. Despite its



fierce, overwhelming appearance this 18 ft, 30,000 lb casting will have a useful function. After leaving the Lynn, Mass., plant of General Electric where it was made it's bound for Puerto Rico. There it will serve in an 82,500 kilowatt steam turbine generator.

### New Puzzler

In a specific number from 1 to 20, which numerical value do you have to add to the character count of that number spelled out, so that the character count of the added numerical value equals one fourth of the numerical value of the first spelled-out number?



## THE BIGGEST, NEWEST IDEA IN WORK GLOVES!

**NORTH** PVC GLOVES

...job-proved for extra safety, extra wear

#### Check these advantages . . .

- **Extremely tough**—Last two to five times longer than ordinary work gloves
- **Very flexible**—Give greater dexterity than any other coated gloves
- **Highly resistant**—Nonflammable, non-oxidizing and resistant to practically all chemicals—will not crack or peel

Give your employees the maximum protection afforded by North PVC Gloves. There's a size to fit every hand comfortably, reducing fatigue and increasing efficiency. As a result, your production will go up, your accident rate will go down. Available in knit-wrist, band top and gauntlet types—palm and partial back coated styles.

**FREE OFFER**—On your business letterhead, kindly furnish us complete details of your working conditions—and we will send you a sample pair.



1600 SERIES. Fully coated, heavy duty.

1800 SERIES. North-Grip—Permruff surface; for handling slippery surfaces.



We also make a complete line of North PVC chemical and foul weather protective garments and the famous Jomac loop-pile industrial gloves, handguards and safety sleeves for up-to-shoulder protection.

**JOMAC Inc.**

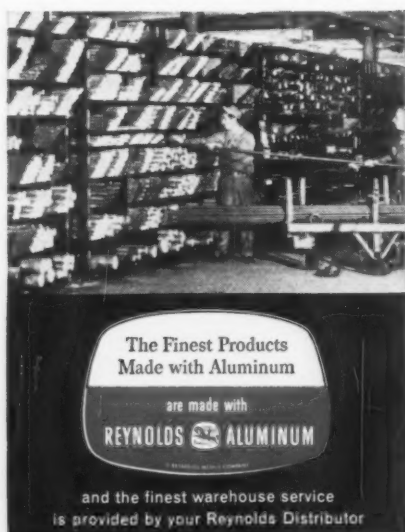
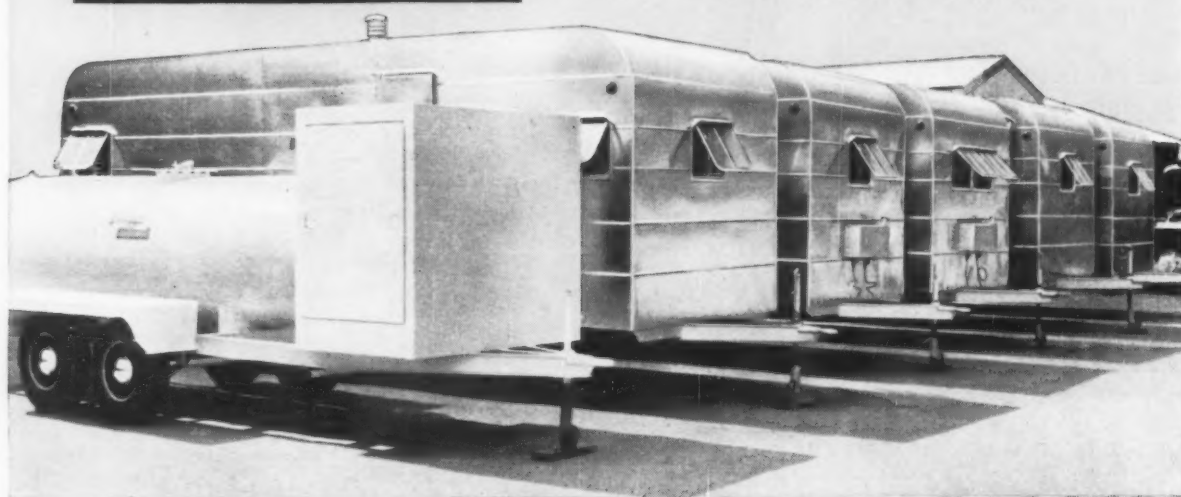
Dept. K, Philadelphia 38, Pa.

Associated companies and distributors throughout the world



"We rely on our  
Reynolds Distributor  
for overnight delivery  
of aluminum"

... A. W. Hayes and George W. Cruse  
of Texas Trailer Corporation, Houston, Texas



*"We fabricate cities of aluminum homes  
for oil firms the world over..."*

"We must have a dependable source of quality aluminum near us." A Reynolds Distributor serves Texas Trailer Corporation and scores of other major fabricators and aluminum users in that area, with quantities ranging from single sheets to carloads. But even more, Reynolds Distributors throughout the country provide the exact aluminum alloy needed... when it's needed... and in the form it's needed. And, they offer technical services and literature. *Reynolds Metals Company, Richmond 18, Virginia.*

Watch Reynolds TV show—"WALT DISNEY PRESENTS"  
—every week on ABC-TV.

**YOUR REYNOLDS DISTRIBUTOR  
IS READY TO SERVE YOU...**

Check the yellow pages of your classified telephone directory under "Aluminum"

## COMING EXHIBITS

**Coal Show** — May 11-14, Public Auditorium, Cleveland. (American Mining Congress, 1200 18th St., N. W., Washington 6, D. C.)

**Design Engineering Show** — May 25-28, Convention Hall, Philadelphia. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

**Material Handling Show**—June 9-12, Public Auditorium, Cleveland. (Hanson & Shea, Inc., One Gateway Center, Pittsburgh 22.)

**Industrial Finishing Show** — June 15-19, Detroit Artillery Armory, Detroit. (Information: H. J. McAleer, 3171 Bellevue, Detroit 7, Mich.)

**Instrumentation Show** — Sept. 21-25, International Amphitheatre, Chicago. (Instrument Society of America, 313 Sixth Ave., Pittsburgh 22.)

**Metal Show**—Nov. 2-6, International Amphitheatre, Chicago. (American Society for Metals, 7301 Euclid Ave., Cleveland 3.)

## MEETINGS

### MAY

**American Steel Warehouse Assn.**—Annual meeting, May 3-6, Drake Hotel, Chicago. Association headquarters, 540 Terminal Tower, Cleveland.

**Air-Conditioning & Refrigeration Institute**—Annual meeting, May 3-6, The Homestead, Hot Springs, Va. Institute headquarters, 1346 Connecticut Ave., N. W., Washington 6, D. C.

**Rail Steel Bar Assn.**—Meeting, May 3-6, Grove Park Inn, Asheville, N. C. Association headquarters, 38 S. Dearborn St., Chicago.

**The Electrochemical Society, Inc.**—Spring meeting, May 3-7, Sheraton Hotel Philadelphia. Society headquarters, 1860 Broadway, New York.

(Continued on P. 16)

# "FASTER FROM FOSTER" PIPE from one of the world's largest warehouse stocks

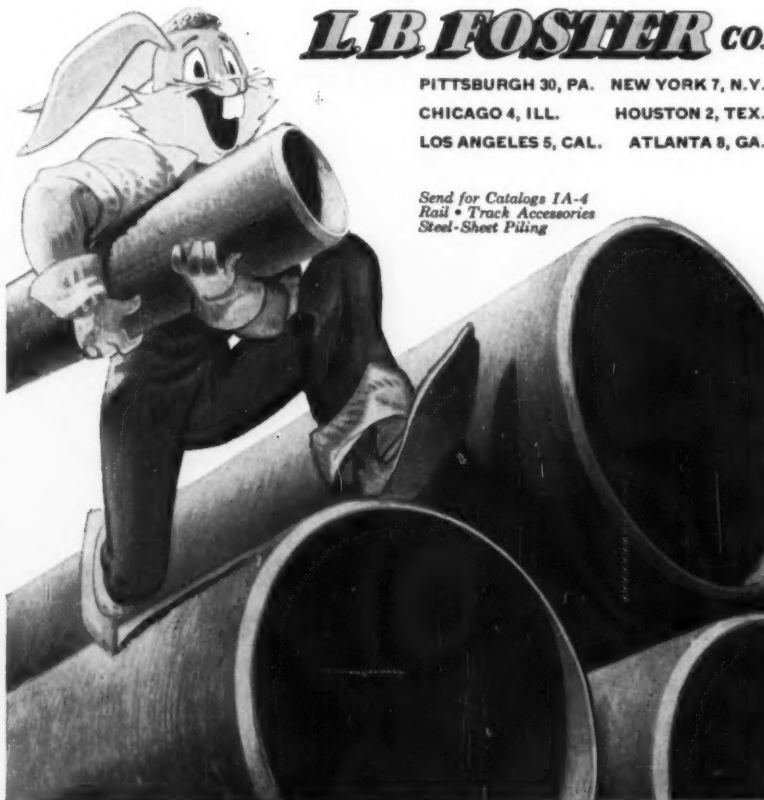
Whether it's a routine order, or an emergency demand for unusual or hard-to-get sizes, depend on delivery "Faster from Foster," *when* and *where* you need it. L. B. Foster Company's six nationwide warehouses stock every kind of pipe. Tested and Structural Steel Pipe 1/8" thru 48", Stainless, Seamless Alloy and Pressure Pipe, Aluminum, Wrought Iron and PVC Pipe in all sizes, walls and specifications.

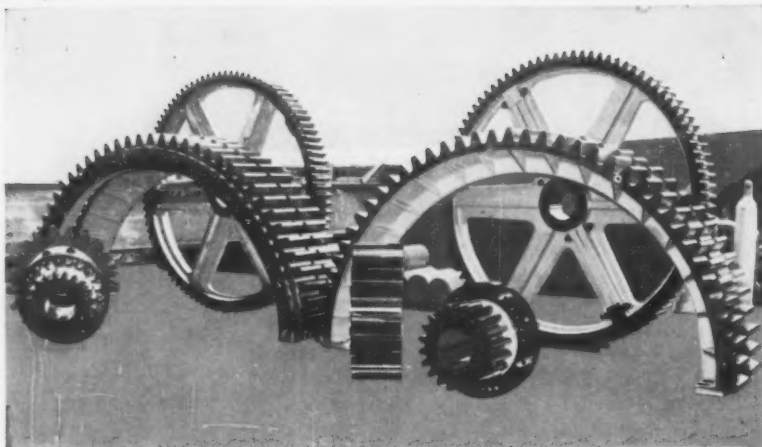
Take advantage of savings in time and money with "single-source" buying. One call to Foster delivers all your pipe requirements, including valves, fittings and flanges. Write, wire or phone the Foster office nearest you.

## L.B. FOSTER co.

PITTSBURGH 30, PA. NEW YORK 7, N.Y.  
CHICAGO 4, ILL. HOUSTON 2, TEX.  
LOS ANGELES 5, CAL. ATLANTA 8, GA.

Send for Catalogs IA-4  
Rail • Track Accessories  
Steel-Sheet Piling





large cast steel gears to your  
designs and specifications

by **Service Foundry**



Avondale's Service Foundry Division manufactures cast steel gears (plain or alloyed) to 15' diameter and 30" face. Gear teeth are cut without limitation to tooth form or size on Service Foundry's large Gleason gear planer. Cast tooth gears are also manufactured regularly. For your next gear order, consult Service Foundry NOW! Write for our illustrated brochure, *Foundry Work—Steels, Alloys & Non-Ferrous.*



**Service Foundry**

a division of

**AVONDALE**

MARINE WAYS, INC.

VERSATILE BUILDER ON THE MISSISSIPPI

416 ERATO ST. • JACKSON 2-3836 • NEW ORLEANS 13, U.S.A.

## EXHIBITS, MEETINGS

(Continued from P. 15)

**Industrial Diamond Assn. of America, Inc.**—Annual meeting and convention, May 11-14, Williamsburg Inn, Williamsburg, Va. Association headquarters, P. O. Box 175, Pompton Plains, N. J.

**Porcelain Enamel Institute**—Mid-year conference, May 13-14, Edgewater Beach Hotel, Chicago. Institute headquarters, 1145 19th St., N. W., Washington, D. C.

**American Supply & Machinery Mfrs. Assn., Inc.**—Annual triple industrial supply convention, May 13-15, Dallas, Texas. Association headquarters, 2130 Keith Bldg., Cleveland.

**Machinery Dealers National Assn.**—Annual convention, May 13-15, Plaza Hotel, New York. Association headquarters, 1346 Connecticut Ave., N. W., Washington 6, D. C.

**American Institute of Chemical Engineers**—National meeting, May 17-20, Muehlebach Hotel, Kansas City, Mo. Institute headquarters, 25 W. 45th St., New York.

**Industrial Heating Equipment Assn., Inc.**—Annual spring meeting, May 17-20, The Homestead, Hot Springs, Va. Association headquarters, 1145 19th St., N. W., Washington 6, D. C.

**Aluminum Wares Assn.**—Annual meeting, May 18-19, The Greenbrier Hotel, White Sulphur Springs, W. Va. Association headquarters, 1806 First National Bank Bldg., Pittsburgh.

**Electronic Industries Assn.**—Annual convention, May 20-22, Sheraton Hotel, Chicago. Association headquarters, 1721 DeSales St., N. W., Washington 6, D. C.

**Aircraft Industries Assn. of America**—Semi-annual meeting, May 20-22, Williamsburg Inn, Williamsburg, Va. Association headquarters, 610 Shoreham Bldg., Washington 5, D. C.





## *Hidden skills help to keep 'em on the hook*

What a tingle peppers your spine as three pounds of fury strike the lure! Rod, line, leader, and plug strain to hold the prize on the hook and bring him to net.

Behind this battle are the skills that made the hook itself. One of the leading makers of hooks is the Auburn Fishhook Company, Inc., Auburn, N. Y., who can assure you that it's a very finicky process. And take it from us: producing this kind of wire is an equally finicky job!

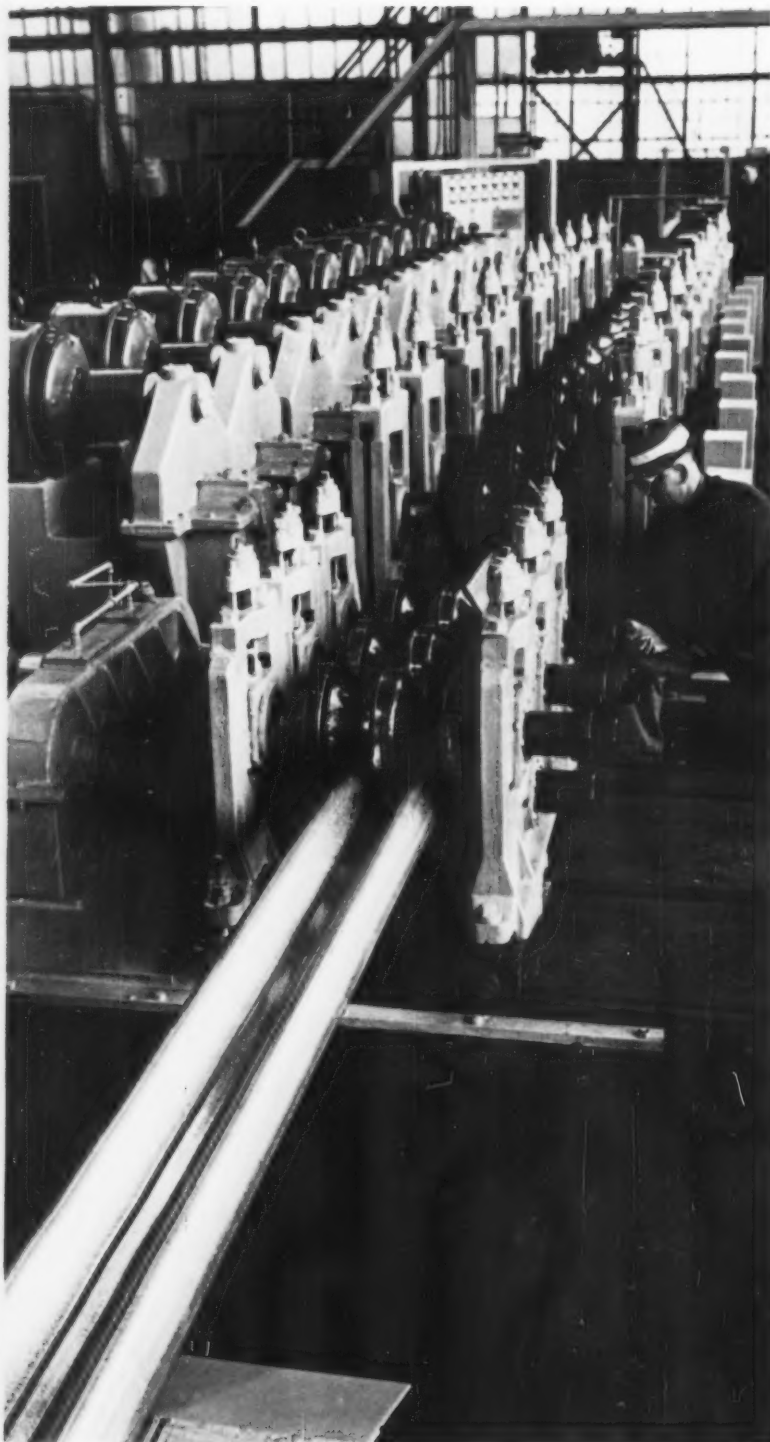
To begin with, the physical characteristics of the wire must be just about perfect so that the small eyelet and incredibly sharp barb and point will form without fracture. And the finished wire must be almost surgically clean so that no lubricant traces can gum up the hook-machine.

Bethlehem has produced fishhook wire in sizes as small as .035-in. diameter. In fact, if it's fine wire you are interested in, we can furnish it down to .007-in. diameter. There's a Bethlehem wire for just about every product, from bolts and nuts to coat hangers, upholstery springs, and can keys.



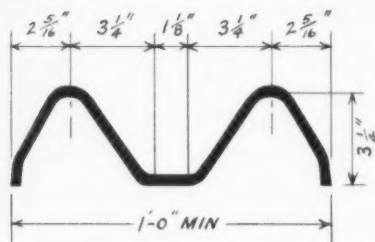
*Bethlehem engineers will help you  
with your steel-working problems*

*This shape is cold-formed  
after continuous galvanizing*



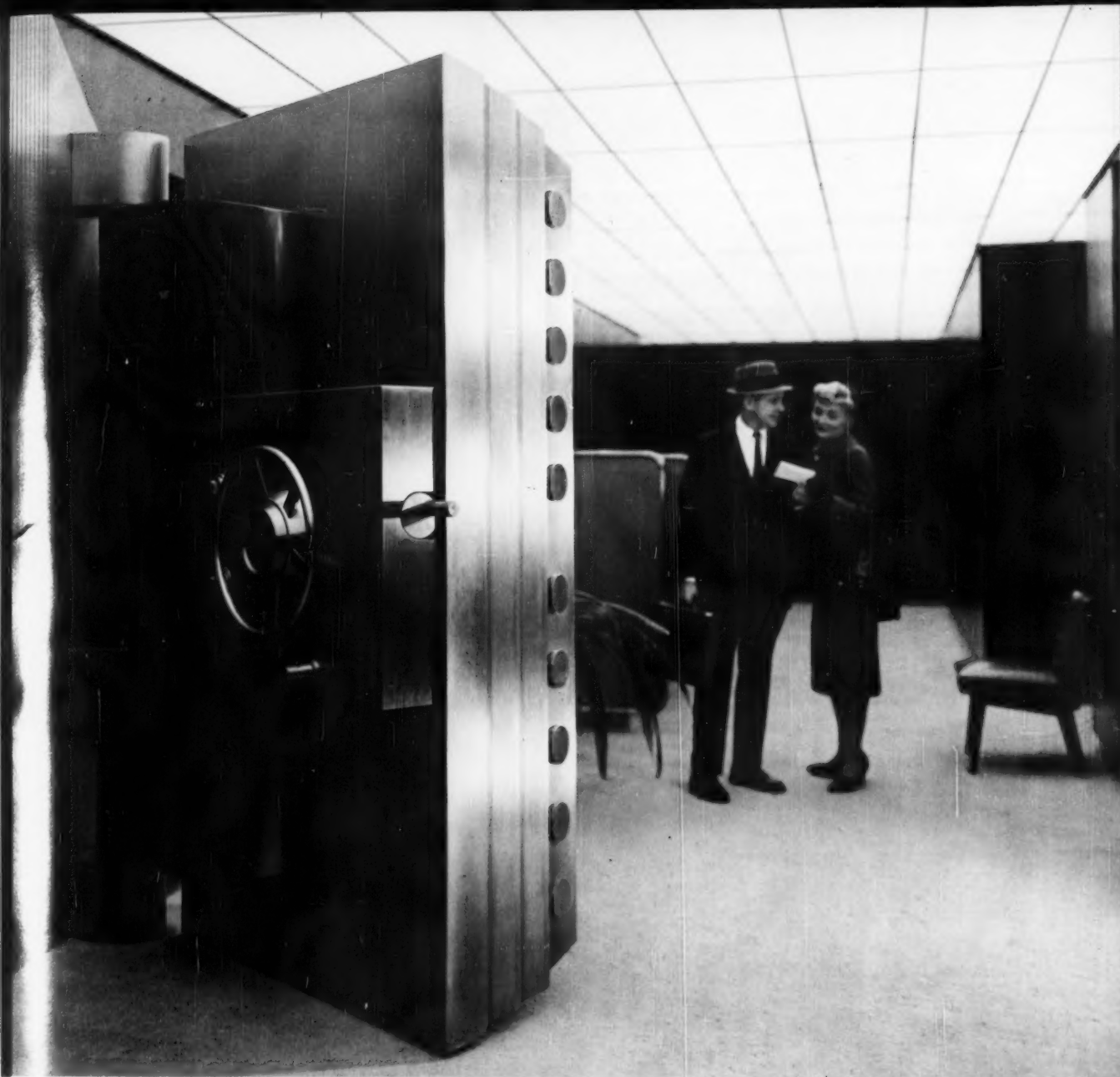
Here in our specialty products shop at Lackawanna, N. Y., we roll beam guard rail for highways, which is severely cold-formed after galvanizing. The raw material is 12 ga continuously-galvanized sheet. The roll train smoothly coaxes the strip into the section shown in the drawing, and does it without the slightest bit of damage to the protective coating of zinc!

Bethlehem cold-formed shapes are uniform in thickness. They eliminate shop-time cutting and bending, end the scrap disposal problem. They have a high strength-to-weight ratio, and often permit the use of a lighter section in place of heavier hot-formed material. We turn out hundreds of shapes—on presses, brakes or rolls, in all gages from 5 to 24, in virtually any length.



*Cold-formed shapes—could  
they better your product?*

A simple pencil sketch, with dimensions indicated, might very well open the door to a new cold-formed shape which you can put to advantageous use, either in an existing product, or as a part of one that's now in the thinking stage. If you have an idea which might be developed, please let us know about it. Send your sketch, plus pertinent information, to us at Bethlehem, Pa.



## *Your valuables are safe behind steel plate*

Billions in jewels, securities, cash, and other valuables rest securely in thousands of bank vaults. The massive vault doors are made of heavy steel plate to resist fire, earthquake, and explosion.

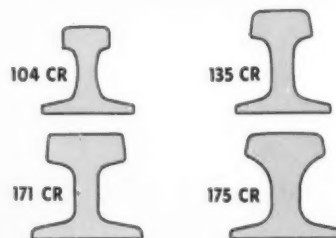
Here we see one such door at The Philadelphia National Bank. Bethlehem plates were used by The Mosler Safe Company in fabricating this 30-ton weldment. The Mosler people have found that the uniformly high-quality of Bethlehem plates, together with proper welding techniques, result in sound welds every time.

Bethlehem furnishes plates in full range of sheared and universal mill sizes. Full information from our nearest sales office. Or write us at Bethlehem, Pa.

*Bethlehem engineers will help you  
with your steel-working problems*



## Four rugged rails for overhead cranes



Runway rails take a real beating as heavy overhead cranes roll back and forth, day after day, year after year. That's why crane rails are usually heavier and more rugged than ordinary railroad rails.

Bethlehem, a leader in the manufacture of rails of all kinds, produces four sections developed especially for crane service. Over the years they have given long, dependable service in a wide range of applications. For still longer life, we can furnish them heat-treated.

If you are having crane runway problems right now, or you plan to install a new runway, a Bethlehem engineer can help you. Or, you might wish to have our Catalog 464, "Bethlehem Crane Rails."

For either one—catalog or engineering assistance—just use the coupon.

## Bethlehem Steels and Specialties

*Here is a partial list of steels and specialty products in the Bethlehem line:*

### **BARS AND BILLETS:**

Carbon and alloy AISI grades  
Concrete reinforcing bars  
Leaded carbon and alloy steels  
Special rolled sections

### **TOOL STEELS:**

A grade for every job

**FORGINGS:** Drop, press, hammer, and upsetter  
Rolled-and-forged special sections

**SHEETS:** Hot- and cold-rolled  
Continuously galvanized

**TIN MILL PRODUCTS:** Electrolytic and hot-dip tin plate; black plate

**PLATES:** Universal and sheared

**ROD AND WIRE:** General and special-purpose types  
Fine and shaped wire

### **WIRE ROPE AND SLINGS**

**FASTENERS:** Standard bolts, cap screws, rivets  
Special fasteners

### **STEEL PIPE:**

Continuous butt weld  
Electric resistance-weld

### **STRUCTURAL SHAPES**

### **COLD-FORMED SHAPES**

### **PALLET RACKS**

**WELDMENTS:** Frames, tanks, housings, vessels

**RAILS:** Tee, crane, girder

**CASTINGS:** Carbon, alloy, and stainless steel  
Grey iron; brass and bronze

PUBLICATIONS DEPARTMENT  
BETHLEHEM STEEL CO., BETHLEHEM, PA.

M6

Gentlemen: I would like additional information on

Name \_\_\_\_\_

Address \_\_\_\_\_

City and State \_\_\_\_\_

*Bethlehem Steel Company, Bethlehem, Pa.*

*On the Pacific Coast Bethlehem products are sold by  
Bethlehem Pacific Coast Steel Corporation  
Export Distributor: Bethlehem Steel Export Corporation*



# BETHLEHEM STEEL



# What new ways can you save with industrial gases

# ?



## ask your Liquid Carbonic sales engineer...

*he has just come from an intensive course on all the latest developments*

So many are the ways to use compressed gases . . . so rapidly do new techniques appear . . . how can you keep up with them all?

*That's our job—a part of Liquid Carbonic service.*

Through a continuing program of "What's New" seminars, Liquid Carbonic sales engineers learn all the recent developments at first hand: new applications of gaseous

and liquid oxygen, liquid nitrogen, hydrogen, acetylene, CO<sub>2</sub>, argon. Cost-cutting ideas for steelmaking, casting, cutting, fabricating, welding . . . all learned from the practical standpoint—all "learned by doing."

Now these up-to-the-minute findings are yours to know and profit by. Simply call on your Liquid Carbonic sales engineer, *first with the latest in industrial gases.*

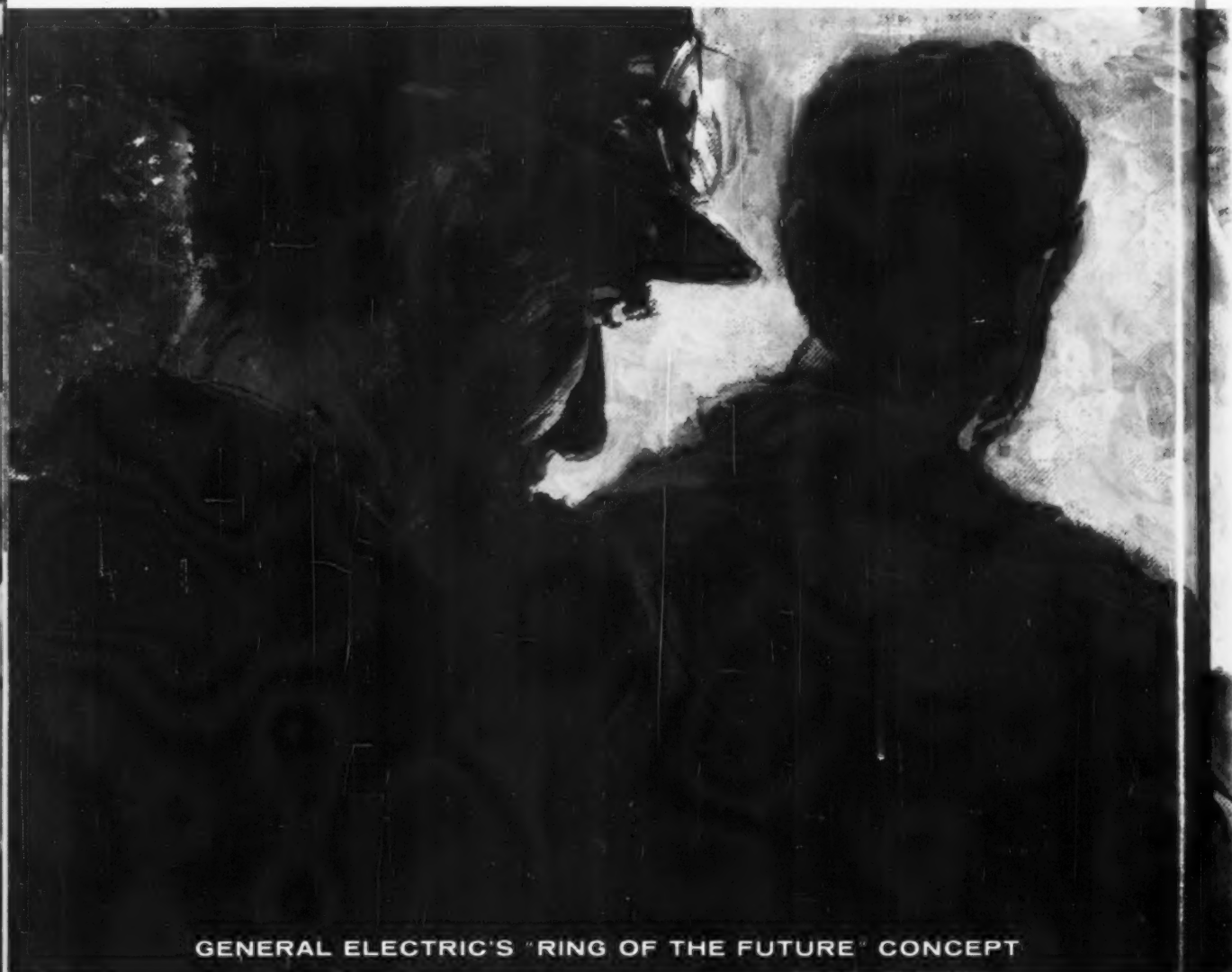


**GENERAL DYNAMICS CORPORATION / Liquid Carbonic Division**  
135 South LaSalle Street, Chicago 3, Illinois

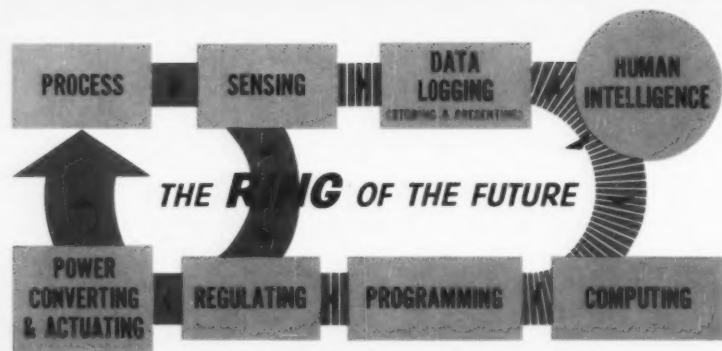
A MAJOR PRODUCER OF COMPRESSED GASES: OXYGEN, ACETYLENE, NITROGEN, HYDROGEN, ARGON, CARBON DIOXIDE, NITROUS OXIDE, HELIUM AND VARIOUS GAS MIXTURES

General Electric can help you...

# MODERNIZE FOR PROFITS ...through automation



GENERAL ELECTRIC'S "RING OF THE FUTURE" CONCEPT



\*Copyright 1958, General Electric Company

## "THE RING OF THE FUTURE"...

... General Electric's approach to automation, helps you blend the products of today into the systems of tomorrow... provides a logical, step-by-step approach to modernization through automation. Start your program now. Call your General Electric Apparatus Sales Office for complete information about the "Ring of the Future" and how it can be applied to:

- REVERSING HOT MILL PROCESSES
- HOT STRIP MILL PROCESSES
- CONTINUOUS MILL PROCESSES
- PROCESS LINE OPERATIONS

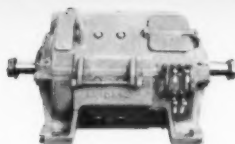
You can meet your competitive challenge decisively with a planned program of modernization . . . modernization that provides greater machine flexibility, higher efficiency and output from your metal rolling and processing systems. General Electric stands ready to assist you in blending the products of today into the systems of tomorrow. To learn more about modernization through automation, mail the coupon below for General Electric's "Ring of the Future"\* kit.

For a 13" x 29" lithograph copy of this painting suitable for framing, write on your letterhead to address below.

CAN HELP YOU MODERNIZE FOR PROFITS



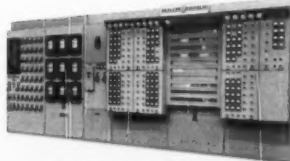
Computers



MD-600 Armored Motors



Main Drive D-c Motors



Custom-Built Controls

TO: SECTION 823-1,  
GENERAL ELECTRIC COMPANY,  
SCHENECTADY 5, NEW YORK

.....Please send me G.E.'s "Ring of the Future" kit.

Name.....

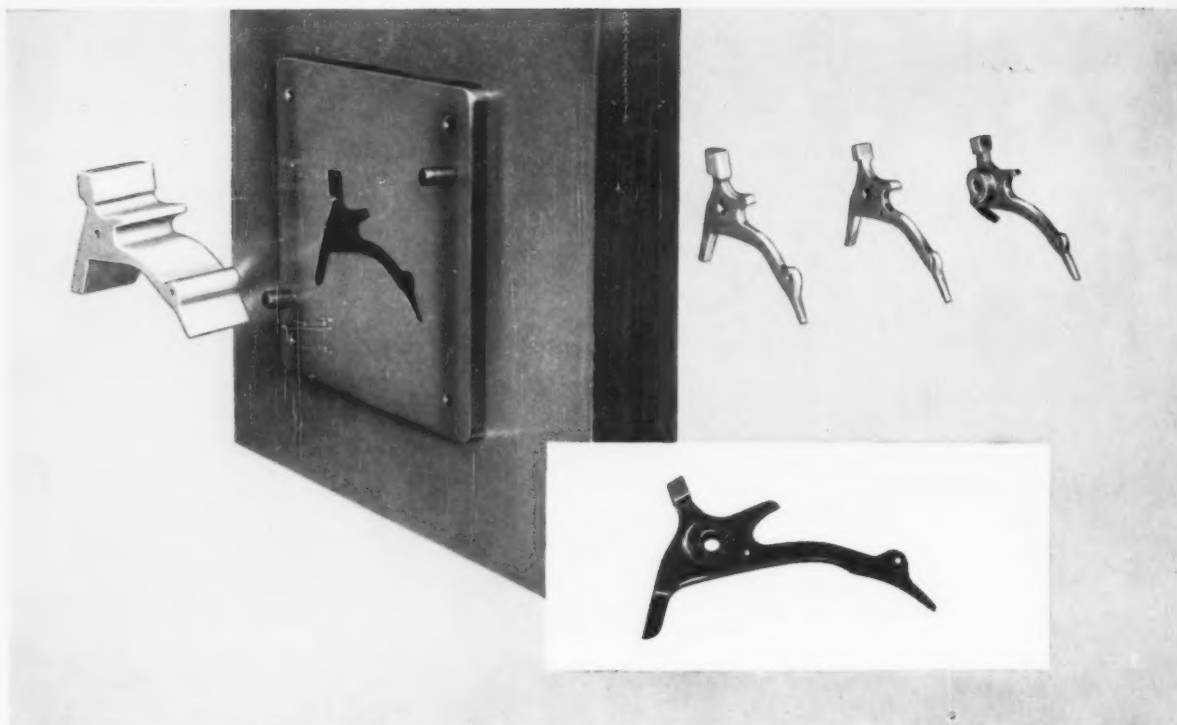
Position..... Company.....

Address.....

City..... State.....

*Progress Is Our Most Important Product*

GENERAL  ELECTRIC



Progression of pieces, all UHB-711 Tool Steel: punch, die, blanked part, drilled and finish machined part, final assembly.

## UDDEHOLM UHB-711 Tool Steel Solves Die And Product Problem

How many ways can a good tool steel work for you? In your die? In your product? Saving production steps? Uddeholm's heavy duty, oil hardening UHB-711 recently did all three. As a result, Harvard Tool & Die Co., of Hartford, Conn., was able to blank a part that once had to be produced entirely by machining.

The part, a small latch assembly, supplied to General Electric, had been machined from a  $\frac{1}{2}$ " thick and 4" wide hot rolled bar. Production was costly. Small in section, the part was subject to fatigue failure at its point of stress. Yet its critical function permitted no such failure. G. E. found that the excellent toughness and shock resisting qualities of Uddeholm's UHB-711 beat the fatigue problem in the latch. Then they found that these same properties, in a blanking die of UHB-711, also

permitted them to blank out the latch with a  $\frac{3}{64}$ " radius at the point. Their last question was answered when the latch, heat treated *after* drilling, finish machining and bending, held perfectly to specified tolerances. Final testing by Magnaflex provided a rejection rate of practically nothing. Now Harvard is also getting excellent results from a die of UHB-711 that is blanking a hole  $\frac{5}{8}$ " x  $\frac{11}{8}$ " in  $\frac{3}{8}$ " thick 321 Stainless Steel!

Performance like this is typical of all Uddeholm tool steels. Users are continually finding Uddeholm tool steel the answer to their problems. A complete selection of air, oil and water-hardening types is available. If you have a tool steel problem, or if you merely want the best in tool steel quality, see your Uddeholm sales representative today.

**Write For Tool Steel Stock List No. 13**



### UDDEHOLM COMPANY OF AMERICA, INC.

Tool and Die Steels  
Cold Rolled Spring Steels

Offices and  
Warehouses

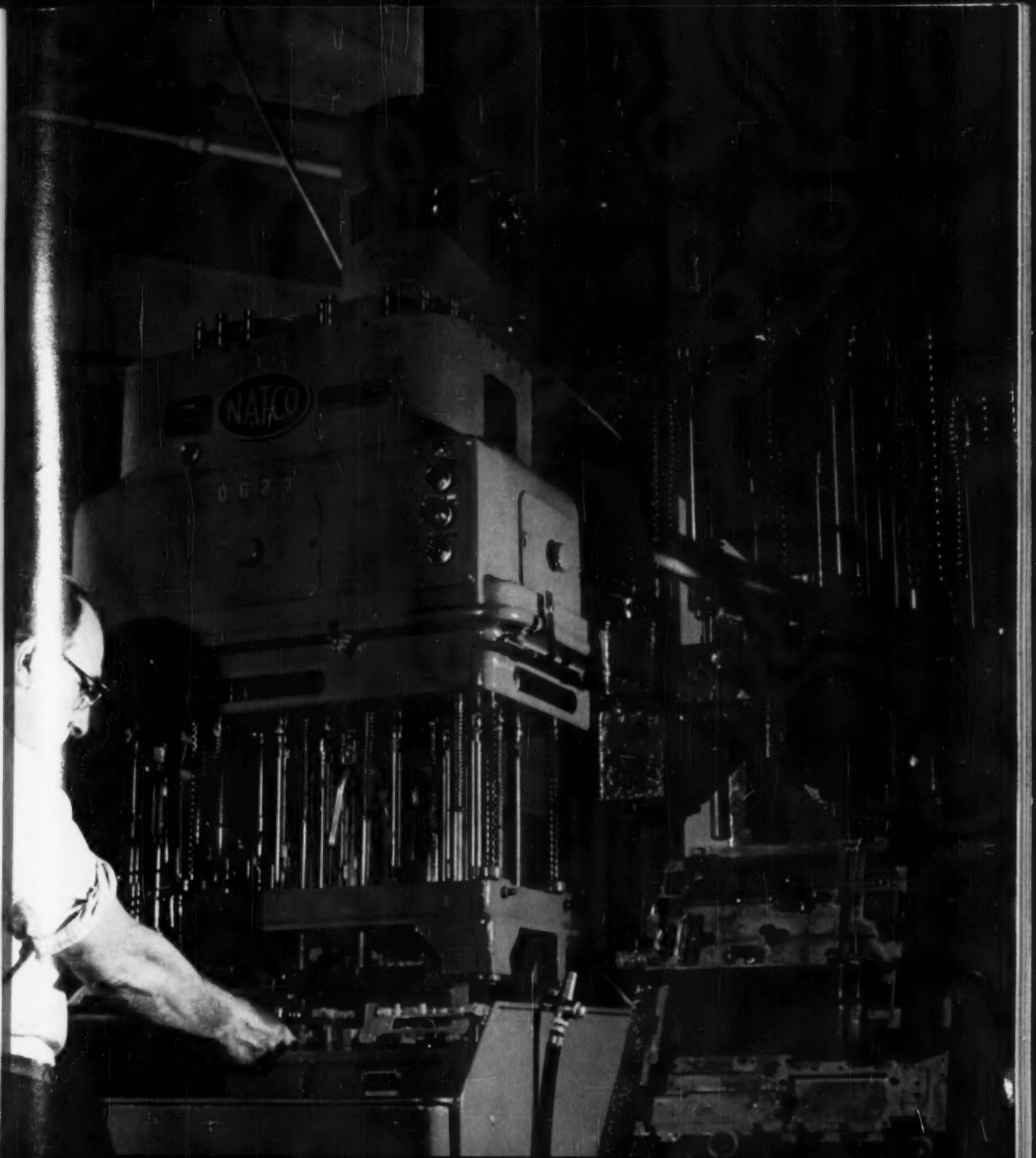
New York: 155 East 44th Street, MUrray Hill 7-4575  
Cleveland: 4540 East 71st Street, DIamond 1-1110  
Los Angeles: 5037 Telegraph Road, ANgelus 2-5121

District Representatives

CHICAGO: Frank J. Mackin, Leroy E. Marshall, 55 East Washington, STate 2-1649  
PHILADELPHIA: Frank T. Campagna, 1418 Walnut St., PEnnypacker 5-2114

DETROIT: Warren H. Nugent, 17304 Lahser Road, KENwood 5-6340  
PITTSBURGH: Lohmeyer Steel Co. 345 Mount Lebanon Blvd., LOcust 3-0122





**"Let the model change.  
These high-production Natcos are ready."**

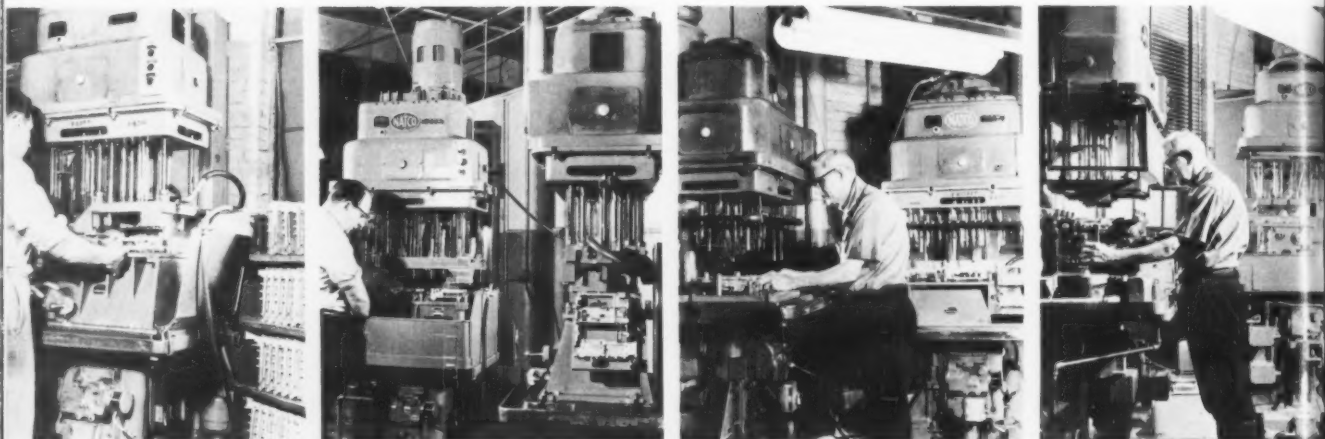
*... says Dictaphone Corporation*

*(complete story other side)*



# Five parts for the cost of one!

## Fast changeover too!



### These 7 standard Natcos do it for Dictaphone!

Costs topped 81%, savings exceeded \$1.00 per part when Dictaphone Corporation, Bridgeport, Conn., switched from gang drill production to this line of seven high-production H-6 Natcos. *Standards*, not specials. They quickly convert when models change; and replacement parts for old models can be run on the same line with minimum time for changeover.

Dictaphone's part is a magnesium main frame for its Time-Master dictating machine. It calls for drilling

97 holes and performing 150 secondary operations—reaming, tapping, counterboring and countersinking on most of them. The seven multi-spindle Natcos handle all but 16 of these operations.

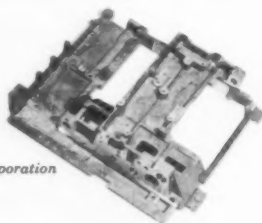
Besides increasing production 81 per cent, the seven Natcos eliminate skipped and creeping holes, and maintain close tolerances. Natco tooling locates the magnesium parts without warping stresses.

On the Natco H-6, the slip plate is the key to flexibility. For example, Dictaphone transferred four Natcos from other assignments, simply by fitting them with new slip spindle plates and, of course, new fixtures. Three new Natcos filled out the line.

Natco H-6 and other multi-spindle drilling machines are available in models from 1 hp with 10 spindles to 50 hp with up to 72 spindles. Write today for complete details or see your Natco representative.

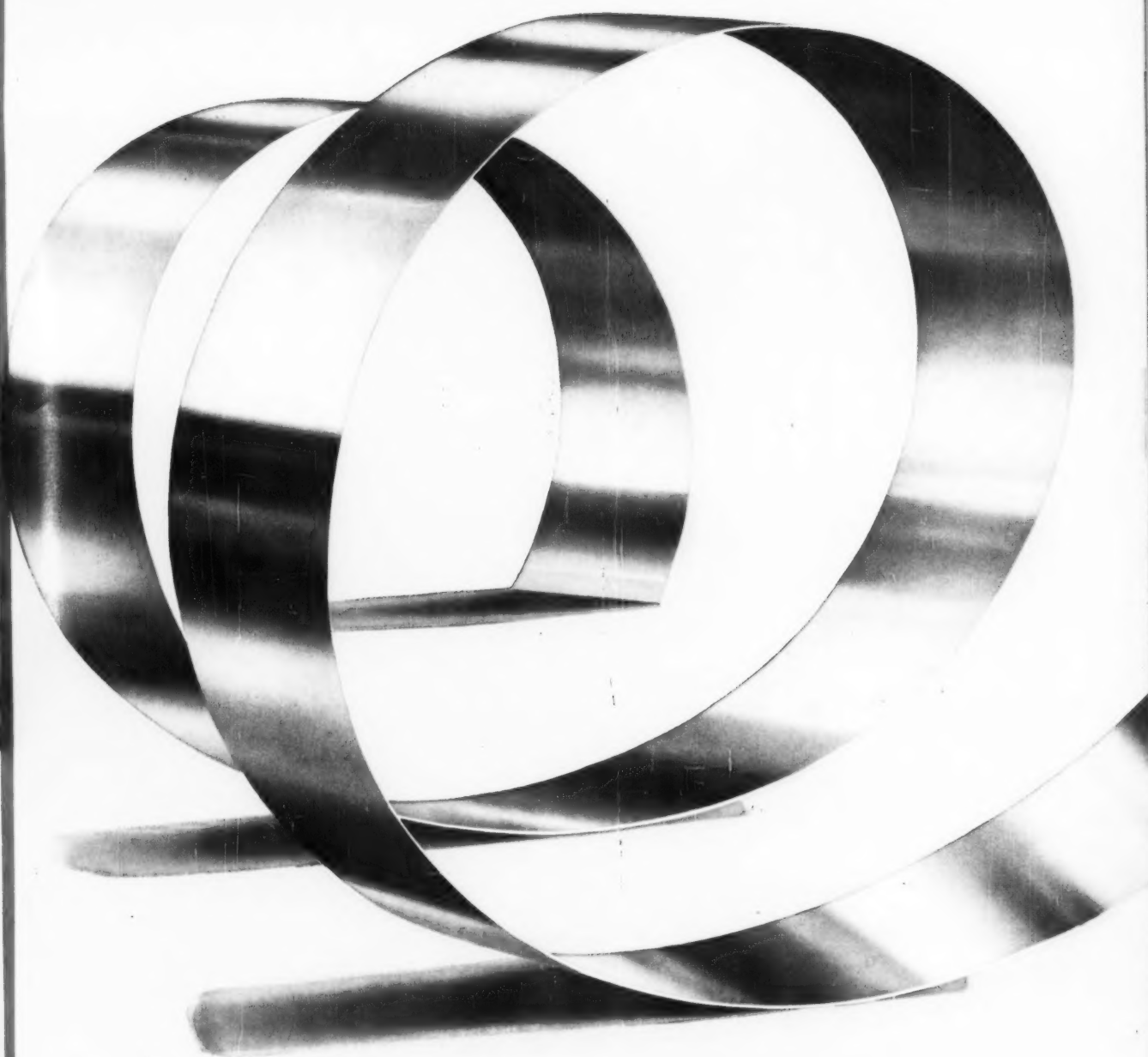
Under the cover of  
the Time-Master \*,  
... profits in 97 holes.

\*Registered trademark of Dictaphone Corporation



NATIONAL AUTOMATIC TOOL COMPANY, INC., RICHMOND, IND.

!



## Crucible stainless matches your high standards

Coil after coil of Crucible stainless gleams with unsurpassed lustre because it is precision-rolled on modern mills. Furthermore, Crucible maintains uniform qualities by methodically checking each heat — and ensures precise gauge with electronic measuring controls. For stainless in all gauges down to .010" and in all strip widths, call or write: Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.

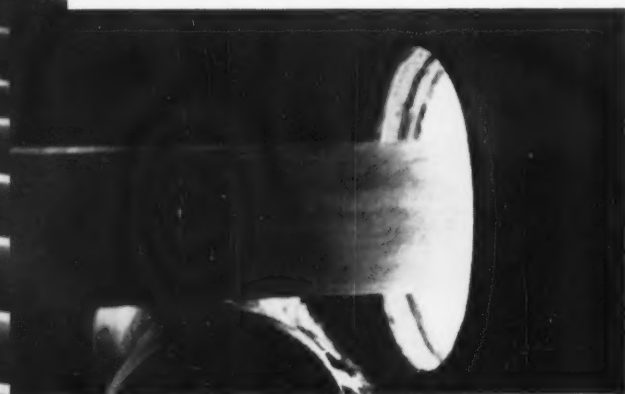
**CRUCIBLE STEEL COMPANY OF AMERICA**

CANADIAN DISTRIBUTOR — RAILWAY AND POWER ENGINEERING CORP., LTD.



**"GAS gives us  
the controllability,  
cleanliness, economy  
and speed we demand"**

*A. O. Smith Corporation*



Lengths of oil well casing are in production at the A. O. Smith Corporation in Milwaukee. They are being stress relieved in a gas furnace.

Gas has proved best on A. O. Smith's production line because of its cleanliness, controllability, speed and economy. Gas gives nearly 50% reduction in cost over their previous fuel, and carbon spots have been eliminated. There are three pre-heat furnaces that heat the pipe to 1650°-1750°, depending on the size of pipe. Three re-heat furnaces bring the temperature back up before quenching.

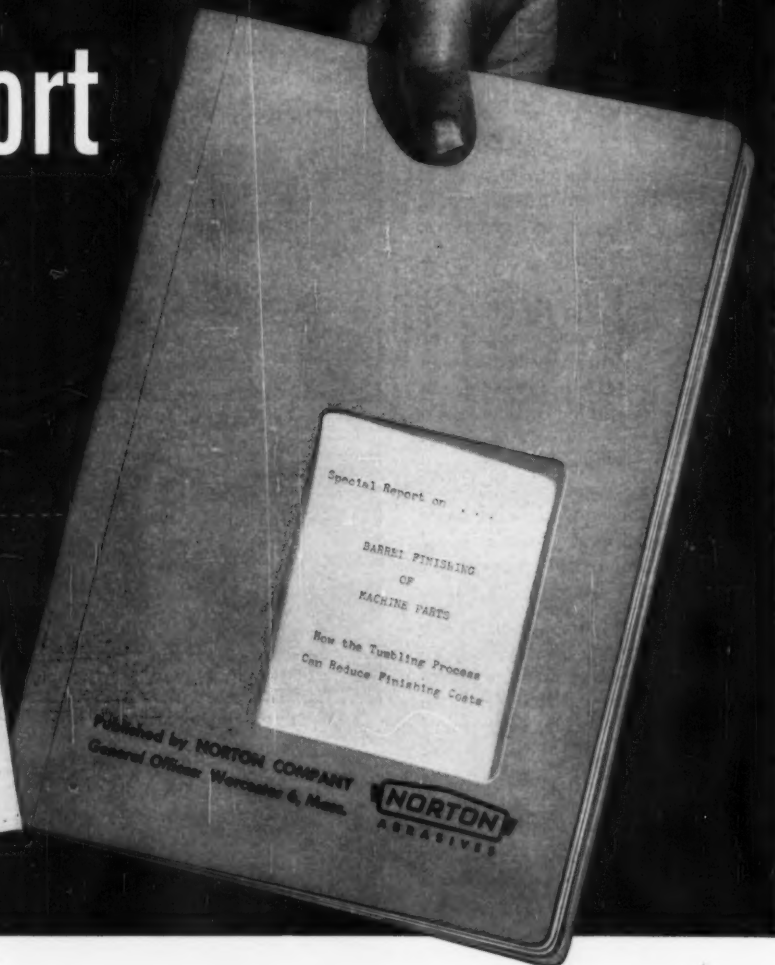
A. O. Smith also produces auto frames, pressure vessels, glass lined farm storage units and tanks, glass-lined gas water heaters and furnaces. Throughout their operations, gas is installed as an integral, indispensable part of their production lines.

For information on how gas can help you in your production operations, call your gas company's industrial specialist. He'll be glad to discuss the economies and superior results you get with modern gas industrial equipment. *American Gas Association.*



# If you finish machined parts this report is for YOU

Published by  
Norton  
Available from  
your Norton  
Representative



*Barrel-Finishing Machined Parts*, one of a Norton series of reports, is based on the outstanding advantages of barrel-finishing over hand-finishing for many jobs.

Written by Norton Abrasive Engineers, who serve all industry, it tells you how barrel-tumbling improves surface finish and fatigue strength, removes burrs, forms uniform radii and reduces the production costs of all types of machined parts. And it describes how many users have found TUMBLEX\* abrasives ideal for these applications. For example:

*Manual finishing of large fabricated aircraft gears with a 4" wide tooth took eight hours each and left the tooth ends rough. With barrel-finishing, using random shaped ALUNDUM\* TUMBLEX "A"*

*abrasive in combination with TUMBLEX "T" triangles, the gears could be tumbled in pairs producing uniform radii and a uniform, refined surface on the entire tooth.*

*Deburring of a tube 2" long, 1/2" I.D., externally threaded, would normally require triangular tumbling abrasive, which would eliminate wedging. But since the I.D.'s also required smoothing, we found ALUNDUM TUMBLEX "S" spheres rolled freely in and out, without wedging or damage to threads.*

Get this report from your Norton Representative. It's as near as your phone. He'll also gladly supply facts and literature on all TUMBLEX Types: "A" (random shaped chips), "T" (bonded triangles), "S" (bonded spheres), and "N" (natural

stones), covering all finishing requirements, on the widest range of materials. And for better, lower cost finishing of your work parts, send samples to our Sample Processing Department. They'll be finished and returned to you promptly, with complete facts as to abrasives, methods and equipment. NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors around the world.

\*Trade-Marks Reg. U.S. Pat. Off. and Foreign Countries

G-343



**Making better products . . . to make your products better**

**NORTON PRODUCTS** Abrasives • Grinding Wheels • Grinding Machines • Refractories • Electrochemicals — BERN-MANNING DIVISION Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

# L-D PROCESS BASIC OXYGEN PROCESS OXYGEN STEELMAKING

## Which is which—How do they differ?

In the rapidly broadening use of oxygen in steelmaking, various names have been applied to differing, and even the same, oxygen steel processes.

To clarify terminology, the American Iron and Steel Institute has assigned the description BASIC OXYGEN PROCESS as the generic term for any basic steelmaking process wherein oxygen gas above atmospheric concentration is a dominant factor. The American Iron and Steel Institute definition is "The term 'basic oxygen steel' is used to define a steel which is considered to be the equivalent of basic open-hearth steel, and whose residual nitrogen content is not in excess of 0.007 per cent."

Specification writing societies including the American Society for Testing Materials and the American Petroleum Institute have applied the same terminology. The American Bureau of Shipping has also used the same general terminology with certain added qualifications.

### L-D Process Explained

The L-D PROCESS, for which Kaiser Engineers is the exclusive U.S. licensor, is one of these BASIC OXYGEN PROCESSES and the one in widest use today. Of approximately 70 furnaces operating or building within this classification, 62 are the L-D PROCESS type.

(The remaining 8 are rotating vessel processes which should not be confused with the L-D PROCESS.)

L-D PROCESS is the generally accepted designation of the process where molten pig iron and scrap is subjected to high purity oxygen blown vertically onto its surface in an upright furnace.

### L-D PROCESS in action



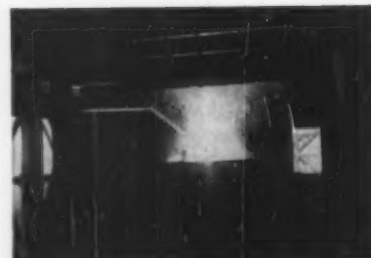
Charging molten iron



Charging scrap



Blowing



Tapping

### L-D Process Advantages

Reasons for world-wide preference of the L-D PROCESS include faster production, better product quality, adaptability to a variety of hot metal analyses, and the low capital investment of about \$13 to \$15 per annual ingot ton vs. \$18 for electric furnaces and \$33 for open-hearths.

The L-D PROCESS has also been termed "Linz-Donau" (Linz on the Danube), "Linz-Donawitz," location of the two originating steel plants in Austria and "Linz Dusenverfahren" which has been interpreted as "Linz Jet Process." Actually, no special significance is attached today in the U. S. to the letters "L-D" other than the fact that they specifically identify, in every part of the world, the generally preferred process for adding new steel-making facilities.

### Complete Steel Plant by KE

Kaiser Engineers designs and builds complete L-D PROCESS installations; also designs and builds complete steel plants including blast furnaces, open-hearth and electric furnace installations, sinter plants, rolling mills, pipe mills, by-products plants, ore beneficiation, air pollution control and water treatment facilities.

For complete new-plant or expansion service, from process design to start-up day, KE offers experience coupled with traditional Kaiser ingenuity. The L-D PROCESS is an example of KE's capability in the application of new developments to the steel industry.

For full information on L-D PROCESS or other KE services in steel plant design and construction, call or write KE at:

Pittsburgh, 330 Grant St., AT 1-7992  
New York, 300 Park Ave., PL 9-1100  
Oakland, 1924 Broadway, CR 1-2211



**KAISER ENGINEERS** engineers-contractors  
Contracting since 1914

Division of Henry J. Kaiser Company • Oakland 12, California • New York, Pittsburgh, Washington, D. C.,  
Buenos Aires, Calcutta, Montreal, Rio de Janeiro, Sydney, Tokyo



# SCHLOEMANN

Aluminum Cable Sheathing Press



Double acting horizontal 1,700 ton aluminum cable sheathing press. Upper: Sheathing power cable. Lower: Hot-chamber extrusion of wire rod.

Cable sheaths from  $\frac{3}{16}$  to 4 inches outside diameter and with any desired wall thickness over .008 inch can be extruded onto heat-sensitive cable cores of any length. The extrusion program may be extended by the production of wire rods, tubes and sections. Full automation of the operating cycle assures uniformly high quality of the products. SCHLOEMANN aluminum cable sheathing presses are operating in the U.S.A., Germany and other countries; main design features are protected by patents. For detailed information send for bulletin P21322.

**FELLER ENGINEERING COMPANY 1190 Empire Building, Pittsburgh 22, Pa.**

HOT AND COLD ROLLING MILLS • COUNTERBLOW HAMMERS • HYDRAULIC PRESSES

# Questions and Answers about ELCIDE 75

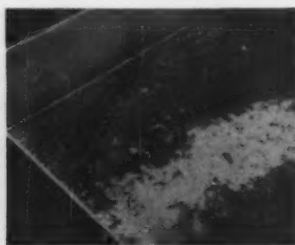
*Here's what you'll want to know about this  
new bacterial inhibitor for soluble oil emulsions:*

**Q: What is Elcide 75?**

**A:** Elcide 75 is a new bacterial inhibitor for standard duty soluble oil emulsions. Chemically, it is a combination of Sodium Ethylmercuri Thio-salicylate (Thimerosal) and Sodium *o*-phenylphenate in a concentrated solution.

**Q: What does Elcide 75 do?**

**A:** Elcide 75 controls bacteria that contaminate soluble oil emulsions. Since both chemical ingredients are anti-bacterial agents, Elcide 75's double action controls a far wider range of bacteria than the commonly used germicides.



Bacteria like these prematurely spoil emulsions. Elcide 75 stops their damage.

**Q: Why is bacteria control important?**

**A:** Bacteria enter emulsions through the air, water, and plant debris. They multiply rapidly and cause odor, corrosion, and premature emulsion breakdown. This compounded damage costs millions of dollars each year in higher maintenance and production costs. Bacteria control reduces these expenses.

**Q: How does Elcide 75 lower operating costs?**

**A:** The use of Elcide 75 can increase emulsion life as much as 5½ times. You use less soluble oil. Fewer man-hours are spent servicing machines and disposing of waste oil. And, because machines run longer between emulsion changes, production is increased proportionately.

**Q: What is the exact dollar return from Elcide 75?**

**A:** No exact figure can be established because conditions vary between plants. The type of metal, machines, and operations involved, the coolant, and general plant housekeeping are all factors that help determine savings due to Elcide 75. The best way to measure its value is to try Elcide 75 and compare the results with untreated machines under your plant conditions.

**Q: How is Elcide 75 used?**

**A:** One ounce of Elcide 75 is added to each four gallons of emulsion. You know you have a safe, effective treatment because you control the dosage.

**Q: Is Elcide 75 safe to employees?**

**A:** Yes. It also eliminates objectionable odors and certain bacteria that may cause skin infections.

**Q: Will Elcide 75 harm machinery or products?**

**A:** No. In fact, Elcide 75 controls bacteria that often cause acidic corrosion and shortened tool life.

**Q: Is more information available on Elcide 75?**

**A:** Yes. Complete data on compatibility, disposal, stability, safety, and other pertinent factors are available on written request.

**Q: Where can I buy Elcide 75?**

**A:** Elcide 75 is sold only through selected distributors. To place your order, or for the name of your nearest distributor, write Eli Lilly and Company, Agricultural and Industrial Products Division, Indianapolis 6, Indiana; or telephone ME1rose 6-2211.



**ELCIDE 75** <sup>TM</sup>  
PATENT PENDING

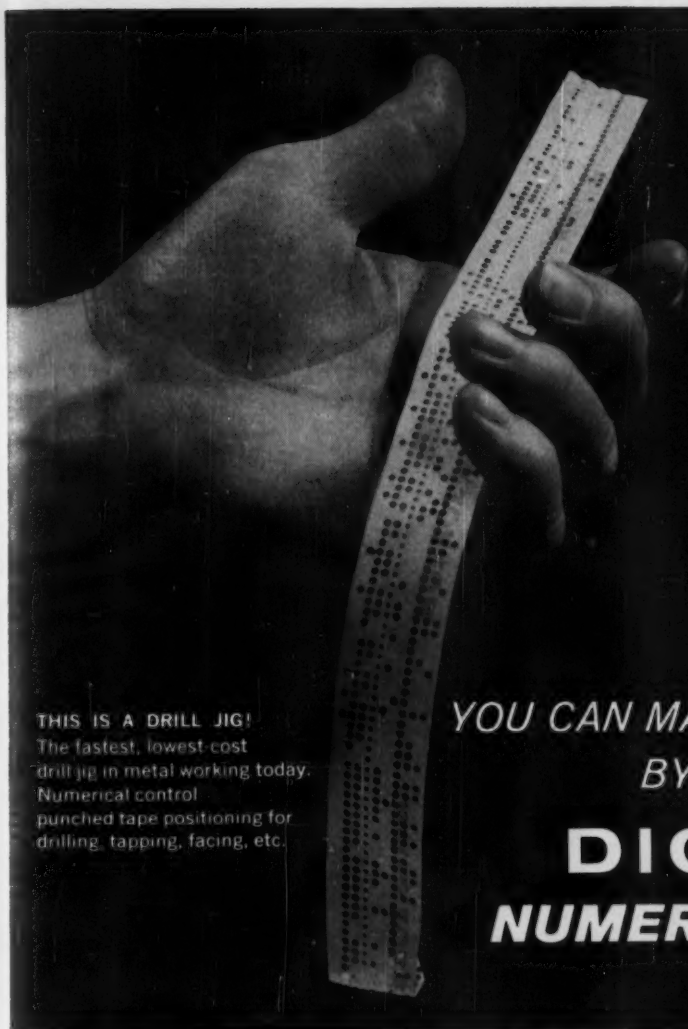
KEEPS COOLANTS FRESH AS A DAISY!

(Lilly's brand of bacterial inhibitor for cutting fluids)

| Package                                | Price per Gal. |
|--|----------------|
| 1-gal. (4 per case), polyethylene..... | \$8.50         |
| 5-gallon, polyethylene.....            | \$8.00         |
| 55-gallon, stainless steel.....        | \$6.50         |

ELI *Lilly* AND COMPANY • AGRICULTURAL AND INDUSTRIAL PRODUCTS DIVISION • INDIANAPOLIS 6, INDIANA





#### THIS IS A DRILL JIG!

The fastest, lowest-cost drill jig in metal working today. Numerical control punched tape positioning for drilling, tapping, facing, etc.

YOU CAN MAKE MORE MONEY NOW!  
BY GETTING INTO

## DIGIMATIC NUMERICAL CONTROL

If you make a variety of parts, in small quantities (1-2000), and often have engineering changes—DIGIMATIC® 202 by Stromberg-Carlson can drastically reduce the cost per part. Here's why.

1. Reduces lead time—because tapes can be made much faster than drill jigs.
2. Cuts down on inspection time—because tape controls are *exactly* repetitive. There's no fatigue factor.
3. Shorter set-up time—only simple holding fixture required.
4. Eliminates scrap and rework due to human error.

In a typical application, the total cost per part for the production of forty parts was reduced from \$7.87 to \$3.29.

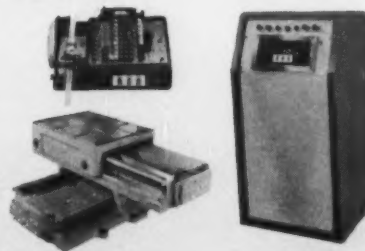
But more important, an engineer-

ing change order was effected in 15 minutes at a cost of \$1.15 as opposed to conventional retooling costs of \$38.40. A saving of 97%!

Every factor that would influence this cost has been considered. The cost of additional floor space, insurance, power, etc., and amortization required over the present machine tool for the DIGIMATIC 202 Control System is included. Complete details and photographs furnished on request.

The only complete, standard system. The DIGIMATIC Control System includes all equipment necessary for numerical control operation. It includes: *Special Punch Tape Preparation Unit* that is as simple to operate as an adding machine. No complicated computer language to learn. *Control Console*—compact

unit, operator maintained, with shop-proven reliability. *Servo Table*—can be adapted to any existing machine in one day. Automatically positions work on ball bearing ways accurately and rigidly within 1½ seconds per hole.



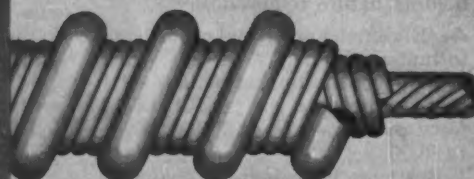
Write for free 12-page booklet, "DIGIMATIC Model 202" containing complete details and illustrations. Also—movies shown at your shop or plant on request.

® "DIGIMATIC" IS OUR TRADEMARK

**STROMBERG-CARLSON** ELECTRONIC CONTROL SYSTEMS  
A DIVISION OF GENERAL DYNAMICS CORPORATION • 1490 N. GOODMAN STREET • ROCHESTER 3, N. Y.




*How NS solved another  
special wire problem*



**REMOTE CONTROL** cable for jet aircraft is made of layers of high-tensile National-Standard wire wound around a stranded core. Heavy outer wire provides helix or worm-gear surface for meshing with hobbled wheels.

# Special National-Standard wire helps fly new jet-liners



When the age of commercial jet transportation in the U.S. began last January, giant jet-liners inaugurated flights across the country at speeds over 600 mph. To control these new aircraft swiftly and easily requires control cables of the utmost reliability, efficiency and endurance.

**NEW COMMERCIAL JET-LINERS**, as well as many military aircraft, are flying now with a unique remote control cable system made of special high-tensile wire wound around a stranded core with a heavy outer wire of stainless steel wound to a pitch of 10 per inch. This outer wire acts as a helix to engage hobbled wheels within the various system control boxes.

**NATIONAL-STANDARD ENGINEERS** worked closely with a control-cable system manufacturer to develop wire of just the proper alloy and rugged physical properties required to withstand extreme tempera-

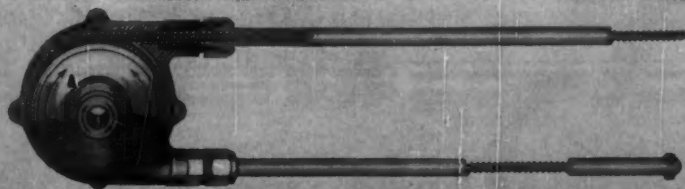
ture and flight stress variations. National-Standard submitted wire samples to microstructural studies and physical tests to assist the customer in determining the conditions that would allow bending cable around pulleys without giving a permanent set to the cable. In addition, alloy steels with various coatings were tested to improve wear and galling resistance for various applications. The result was the development of a special stainless-steel wire that exceeded rigid specifications.

**EXPERIENCED ENGINEERING HELP**, of this kind, for jobs requiring high-quality wire to meet special or unique applications, is available to you from National-Standard. For any of the many thousands of applications where only special wire will solve the problem, let National-Standard engineers go to work for you. Write for additional information to National-Standard Company, Niles, Michigan.


*Manufacturer of specialty wire and metal products*



**DIVISIONS:** NATIONAL STANDARD, Niles, Mich.; tire wire, stainless, music spring and plated wires • WORCESTER WIRE WORKS, Worcester, Mass.; high and low carbon specialty wires • WAGNER LITHO MACHINERY, Secaucus, N. J.; metal decorating equipment • ATHENIA STEEL, Clifton, N. J.; flat, high-carbon spring steels • REYNOLDS WIRE, Dixon, Ill.; industrial wire cloth • CROSS PERFORATED METALS, Carbondale, Pa.; decorative, commercial, and industrial perforated metals.



**FLEXIBLE CABLE** engages accurately with specially hobbled wheels housed in control boxes. This combination requires special cable wire that will not take permanent set and will provide smooth, hard bearing surface for cable inside conduit.



**NATIONAL-STANDARD** engineers made intense microstructural and tensile studies of sample wire to find exact physical properties of the alloy to meet strict aircraft control specifications.



# Metallurgical Memo from General Electric





# Why 242 different toolholders?

Metallurgical Products Department reports  
on an expanded new line of Lift-O-Matic toolholders  
... 242 sizes to speed changeovers on every job

Nobody needs to tell you what carbides have done for metalcutting . . . or how Carboloy® disposable inserts have led the way. *But making inserts is only half the job*; the other half is to provide you with toolholders that let you get full value from these miracle metals.

*Carboloy Lift-O-Matic toolholders do this job.* There are now three types—positive rake, negative rake, and tracer. All provide access to the clamp setscrew from either top or bottom—all provide for fastest possible indexing or changeover—all cut your inventory needs by providing interchangeability of parts. In addition, Carboloy *heavy duty* toolholders are made for cutting conditions where a maximum strength holder is demanded.

This expanded Lift-O-Matic toolholder line is stocked by your *local* Authorized Carboloy Distributor—3 types, 9 styles, 242 sizes—*plus* the widest range of styles, sizes, and grades of *inserts* in the industry. Call him (see the Yellow Pages under "Carbides"); or write: *Metallurgical Products Department of General Electric Company, 11153 East 8 Mile Street, Detroit 32, Michigan.*



New! Self-raising chipbreaker clamp. A twist of the wrist releases insert for indexing . . . automatically lifts and lowers chipbreaker. No more prying chipbreaker free. No more fumbling with loose chipbreaker. You choose from three chipbreaker widths for more accurate chip control.

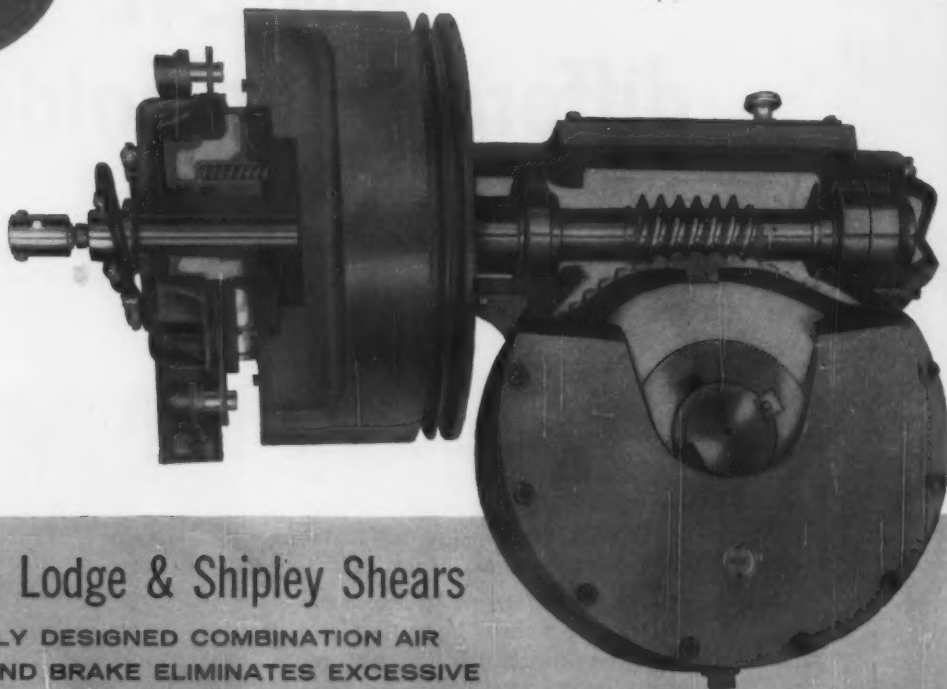
**CARBOLOY®**  
CEMENTED CARBIDES

METALLURGICAL PRODUCTS DEPARTMENT  
**GENERAL  ELECTRIC**

CARBOLOY® CEMENTED CARBIDES • MAN-MADE DIAMONDS  
MAGNETIC MATERIALS • THERMISTORS • THYRITES • VACUUM-MELTED ALLOYS

# EXTRAS

on the machine . . . not on the invoice!



## Only on Lodge & Shipley Shears

...SPECIALLY DESIGNED COMBINATION AIR CLUTCH AND BRAKE ELIMINATES EXCESSIVE MAINTENANCE COMMON ON HEAVY DUTY PLATE SHEARS

The "standard extras" you find on Lodge & Shipley Shears, although not reflected in the price, are important in time-saving, effortless operation, accuracy and low-cost service.

**THE COMBINATION AIR CLUTCH AND BRAKE**, for example . . . its single unit design positively eliminates overlap between clutch and brake. Disc-type construction is self-adjusting for fast, smooth starting and safe, positive stopping. The clutch provides automatic overload safety; the brake applies automatically in the event of electrical or air supply failure.

**NO OTHER SHEAR, EVEN AT EXTRA COST**, can offer the exclusive combination of features found, for instance, on the  $\frac{1}{2}$ " Lodge & Shipley Shear:

- 2-stage Hydraulic Holddown System
- Remote-operating Foot Control • Ball Transfer Table
- Motorized Front-Operated Back Gauge
- One-piece Shaft with Integral Eccentrics
- Blade Clearance Indicators • Air Counterbalances
- Air-cushioned Back Gauge • Blade Changing Jigs
- Fast, One-man Upper Blade Adjustment
- Independent Holddown Fingers • Quad-life Worm Gear

Find out how much more you get . . . **WITHOUT EXTRA COST** . . . on a Lodge & Shipley Shear. For details, see Sweet's Machine Tool File or request Bulletin No. PS-15 from: The Lodge & Shipley Co., 3073 Colerain Ave., Cincinnati 25, Ohio.



Capacities to  $\frac{1}{2}$ " x 12'

## Lodge & Shipley

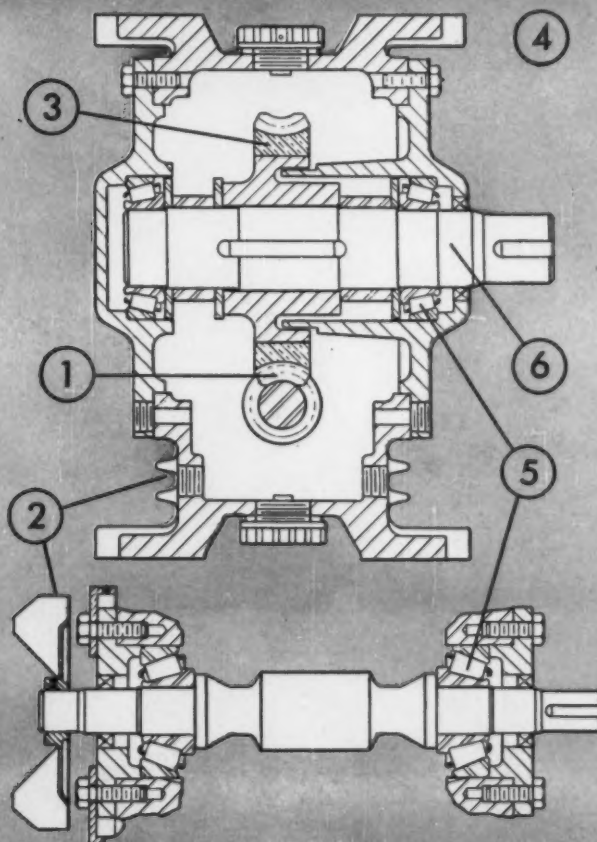
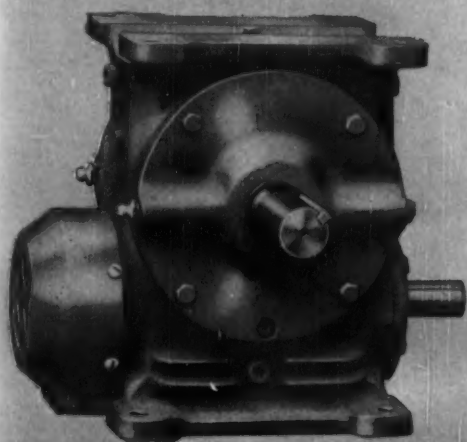
Your LODGE-ical Choice!

# DELROYD

VERSO WORM GEAR  
SPEED REDUCERS

a new standard  
in worm gear design

smaller space  
and  
more horsepower  
per dollar



Make this  
value  
analysis  
NOW!

1. Involute helicoid thread form has highest load capacity of any type of worm gear.

2. Fan cooling and ribbed construction give maximum effect of heat dissipation.

3. Centrifugally cast bronze dished gear—dry well construction.

4. Unit may be mounted in any posi-

tion. Alternate mounting surfaces.

5. Tapered roller bearings used throughout—provide maximum load capacity.

6. Heat treated alloy steel gear shaft with bearing and sealing diameters provide a strength of 185% of an untreated shaft of the same diameter.

Send for Catalog No. 5018



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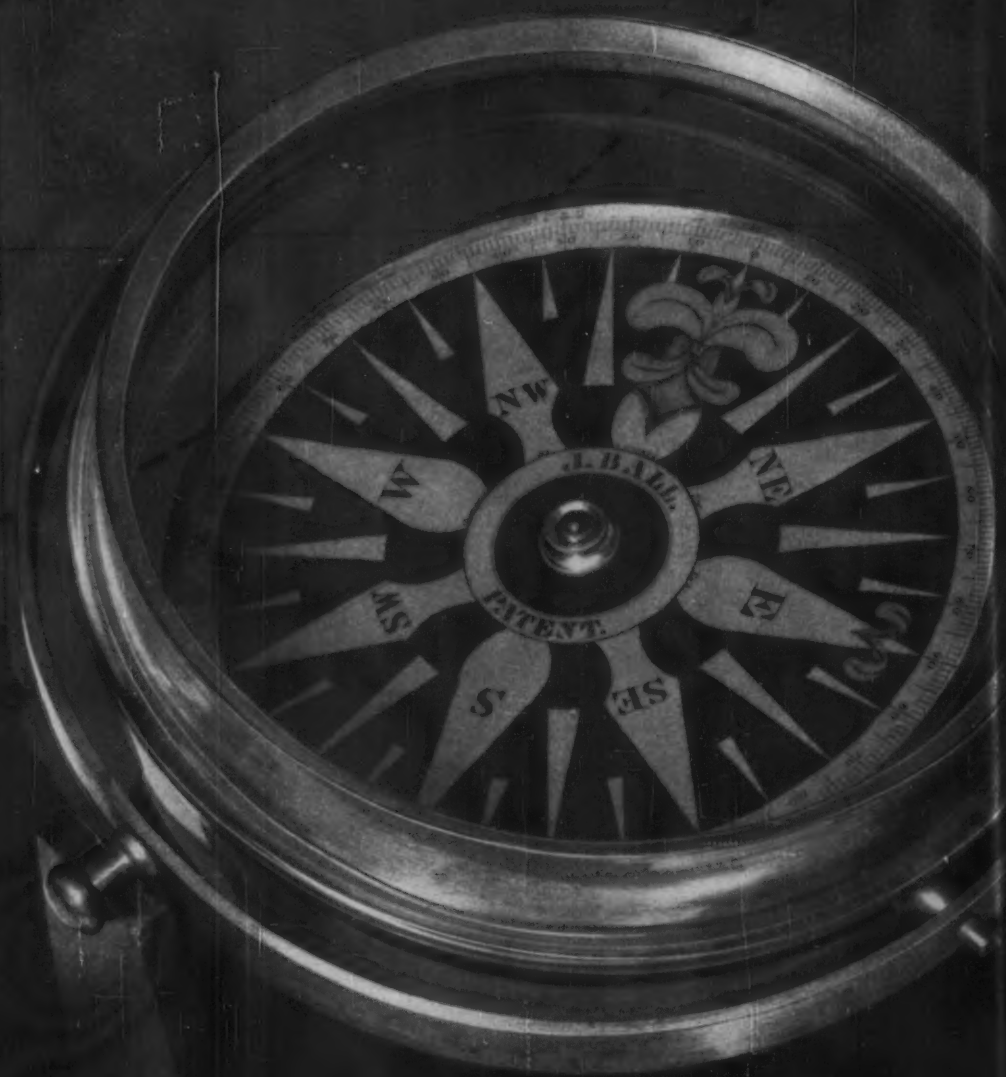
Steam Turbine Company

899 Nottingham Way, Trenton 2, New Jersey

DL444

THE IRON AGE, April 30, 1959

39



MARINER'S COMPASS, patented 1835 by Jonathan Ball, courtesy of The Smithsonian Institution



In every direction...

Eastern stainless sheets and plates are available *locally* . . . through the industry's finest DISTRIBUTOR WAREHOUSE NETWORK. Contact your local steel service center for prompt delivery of in-stock Eastern stainless . . . which may also include coils and strip . . . to meet production schedules and minimize your inventory, too.



**EASTERN**

**STAINLESS STEEL**

BALTIMORE 3, MARYLAND, U. S. A.

World's largest exclusive producer of stainless steel sheets and plates



# BRIEFS

on a handy booklet for anyone who  
buys caustic soda...how to keep  
arsine out of pickling baths...how to  
cut degreasing costs...a chemical  
for electroless nickel plating



## Caustic Soda Buyer's Guide offers fast facts

Quick answers to questions on caustic soda abound in this pocket-sized booklet.

You'll find in it basic information on forms and grades, containers and shipping methods.

One section deals with the comparative economics of 50% and 73% liquids solutions. It includes a table and nomograph to help you decide which concentration is the better buy for you.

Another nomograph helps you estimate instantly how much caustic of a given strength you need to get a given volume of your process solution.

We've also pointed out some factors you might consider when choosing a supplier.

Just clip the coupon for a copy.

## How to help keep arsine out of pickling baths

If there is any arsenic in the muriatic acid you use for pickling, it can combine with free hydrogen to form arsine, a dangerous compound to have around.

Arsenic can also be reduced to the metal, leaving spots on the articles you pickle.

All this makes us happy that there

is not a bit of arsenic in either of the grades of muriatic acid we sell. In fact, the level of all impurities is quite low. Sulfates check in at a low 0.003% in both our Commercial Grade and Hooker White Grade. There's less than 0.0005% iron in Commercial, less than 0.0001% in Hooker White.

We ship both grades in 18°, 20°, and 22° Baumé solutions in rubber-lined tank cars. Literature will be sent upon coupon request.

## Are your degreasing costs too high?

If they are, one reason may be that you have to constantly add new stabilizers to the trichlorethylene you use.

If you are one of those who have to titrate baths frequently and then freshen them up, you may be surprised to learn that there is a trichlor you never have to add stabilizer to—NIALK® TRICHLOR.

NIALK, and only NIALK, has psp

—permanent STAYING power—in its neutral stabilizer. This stabilizer just does not wear out during normal use. Even after repeated distillation, it's still active, still protecting your trichlorethylene against heat, light, air, moisture, acids, and active metals.

If you'd like to know more about this stable trichlorethylene, send us the coupon.

## Electroless nickel plating with $\text{NaH}_2\text{PO}_2 \cdot \text{H}_2\text{O}$

There's been a lot of activity of late in the electroless nickel plating of metallic and plastic objects by co-deposition of metals and metallic phosphides.

This probably explains the increased business we're enjoying with our sodium hypophosphite, commercial grade.

Our free-flowing, white, odorless crystals are available in 100- and 325-lb. fiber drums.

Our technical data sheet is offered in the coupon.

For more information on the chemicals mentioned on this page, check here:

- ☐ Caustic Soda
- ☐ Muriatic Acid
- ☐ Trichlorethylene
- ☐ Sodium Hypophosphite

Keep your file current with data on these other Hooker chemicals:

- ☐ Virgo® Descaling Salt
- ☐ Virgo Electrolytic Salt
- ☐ Virgo Molten Cleaner
- ☐ Oxalic Acid

Clip and mail to us with your name, title, and company address. (When requesting samples, please use business letterhead.)

## HOOKER CHEMICAL CORPORATION

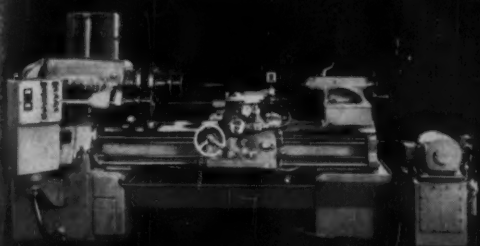
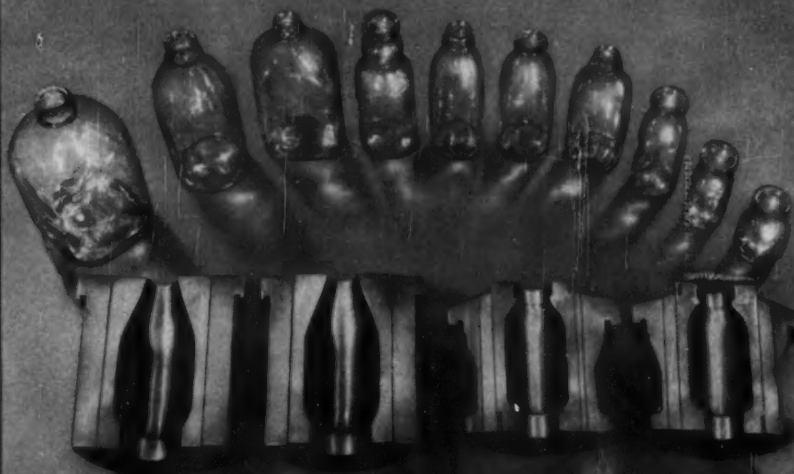
304 UNION STREET, NIAGARA FALLS, N. Y.

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**HOOKER**  
CHEMICALS  
PLASTICS

# Don't Tool Up for Tomorrow's Boom with Yesterday's Lathes

## MONARCH'S SPECIAL-PURPOSE LATHES OF TOMORROW...



### 1..The New Rotary Profile Tracer Lathe for Non-Circular Cross-Section Work

Up to *three times* more productive than equipment now in common use! Hand finishing drastically reduced! This new Monarch says "Lower Costs" two ways—on circular or non-circular cross-section work, such as the bottle molds above.

It has speed and accuracy that's only been a dream till now. Featuring the new Monarch super-sensitive electro-hydraulic tracer, it delivers accuracy of duplication of  $\pm .001$ " when the tool is travel-

ing at a 100" per minute rate. At only a slight increase of error, tool travel up to 300" per minute is possible.

Stylus deflection pressure is a low  $1\frac{1}{2}$  ounces. Electrical amplification of its movement instantly translates work contour change into hydraulic slide movement.

As you see, the master spindle is mounted at the front of the machine for ease of setup and operation. There's a positive gear drive from the headstock spindle through

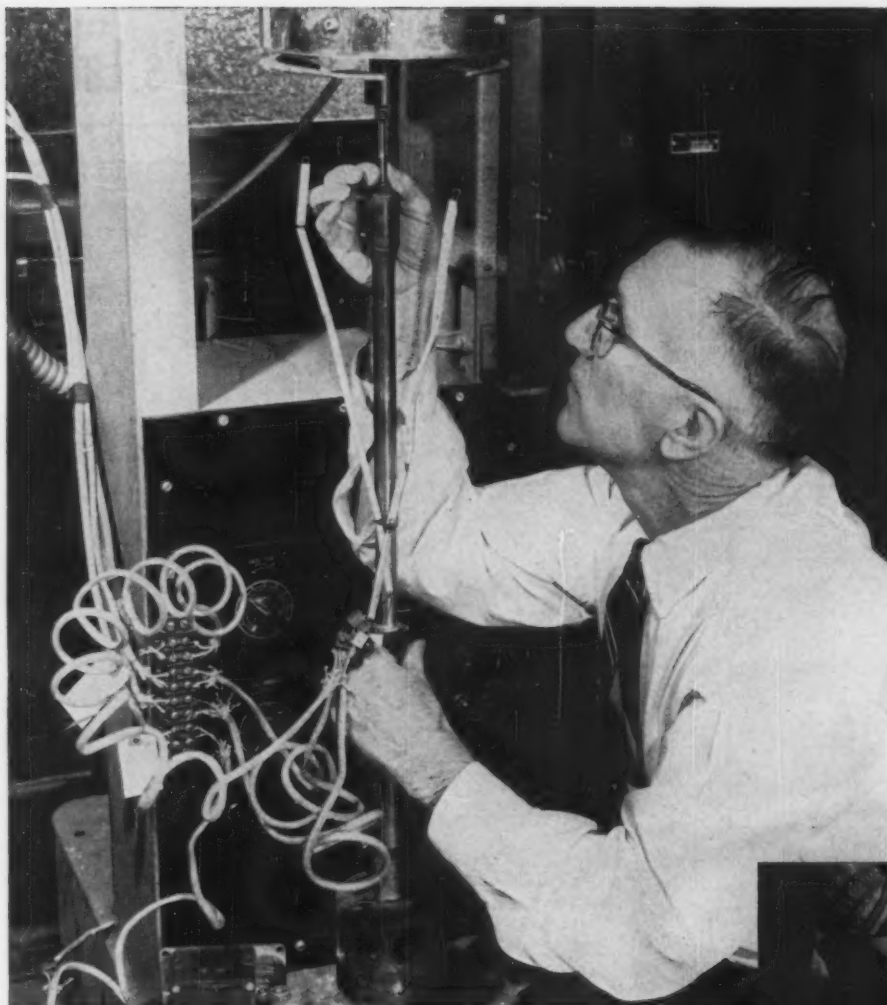
a quadrant-mounted idler which may be adjusted to eliminate any backlash between the lathe spindle and the master.

Want your costs to plunge downward? If that isn't worth a letter of inquiry—what is? *The Monarch Machine Tool Company*, Sidney, Ohio.



IF IT CAN BE TURNED, THERE'S A MONARCH TO DO IT BETTER AND FASTER





Physical tests at Standard include those for special properties of steel alloys under extreme variations in temperature. Here, the strength and ductility of steel are being checked for resistance to stress under severe conditions of elevated temperatures over a prolonged period of time.

Charpy impact and transition temperature determinations have recently assumed importance in many applications. Here a steel sample is immersed in liquid nitrogen to determine its susceptibility to fracture at temperatures as low as  $-300^{\circ}\text{F}$ .



## Quality control—a vital activity at Standard Steel Works

Every conceivable shop and laboratory test required for modern quality control can be performed by Standard's staff of metallurgical technicians. Testing of incoming raw materials; physical property tests of steel and other alloys at temperatures from several hundred degrees below zero up to red heat; gas analysis, ultrasonic, X ray, magnetic particle, fluorescent penetrant and microscopic examination of finished products are routine checks which assure that the finished, delivered product will meet the most rigid specifications. Write Department 1-D for full details.

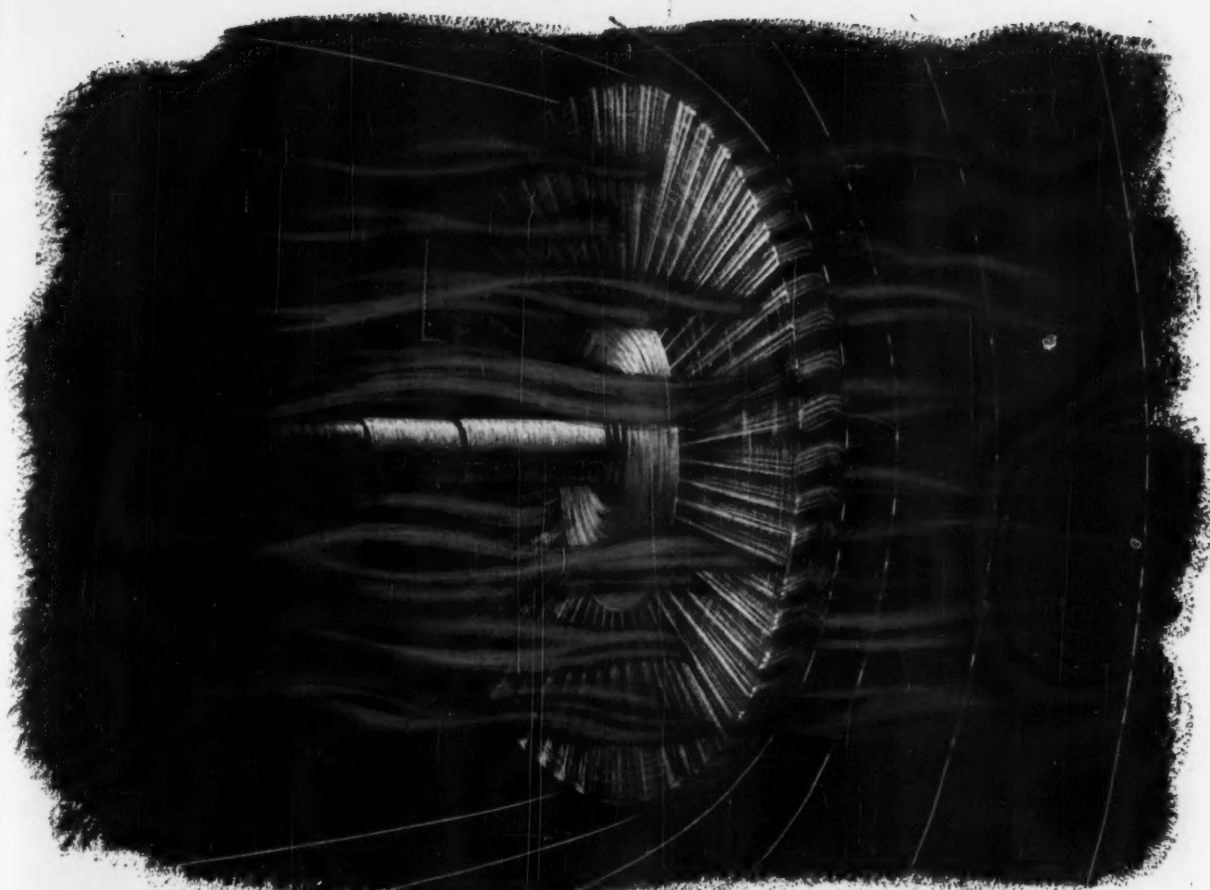
**Standard Steel Works Division**  
**BALDWIN · LIMA · HAMILTON**

BURNHAM, PENNSYLVANIA

Rings • Shafts • Car wheels • Gear blanks • Flanges • Special shapes







1400

1600

1800

2000

2200

2400

## *Boring into the Heat Barrier*



Heat-treating facilities are part of the complete metallurgical services available at Haynes Stellite Company.

**E**xtremely high centrifugal forces, plus prolonged operation well above 1700 deg. F.! That's the achievement of thousands of jet engine turbine wheels and blades investment-cast of HAYNES high-temperature alloys.

Resistance to stress, to thermal shock, to erosion, corrosion, and to fatigue are typical properties that make these alloys so extremely useful in many of the hot spots in today's jet engines, ramjets, missiles, and rockets.

Whether investment- or sand-cast, wrought, vacuum melted, or air melted, there's a HAYNES high-temperature alloy to meet your needs.

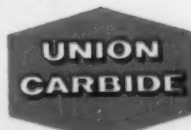
# **HAYNES**

## **ALLOYS**

**HAYNES STELLITE COMPANY**

Division of Union Carbide Corporation  
Kokomo, Indiana

Address inquiries to Haynes Stellite Company, 420 Lexington Avenue, New York 17, N. Y.



"Haynes" and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

## Allen Hughes

### cut abrasive costs 18 to 1 at

Grinding the gripper-die marks off a jet turbine blade can be an expensive business. At the Harrisburg Works of Thompson Ramo Wooldridge, these super-alloy steel blades used to be semi-finished with coated abrasive belts until Industrial and Abrasive Control Engineer Paul Mazich started checking up on costs.

Mazich called in Bay State Abrasive Engineer Allen B. Hughes and he dug into the problem. Working with Bay State distributor General Machinery & Equipment Company, Hughes made a series of careful tests. The result was a grinding wheel that cut the annual cost of abrasive materials

alone from \$18,000 to \$1,000. Its unique combination of special bond and abrasive grit increased cutting spread, prevented loading and eliminated the need for dressing so successfully that productivity rose, labor costs dropped and there were additional savings of around \$5,000.

Like Allen Hughes, the Bay State Abrasive Engineer in your area is a trained expert. He backs up the work of the experienced men who represent Bay State's topflight distributors and Bay State's research labs back them both with new ideas, techniques and materials. *Better grinding at lower cost . . . that is our business.*



Industrial Engineer Paul Mazich examines finish on jet engine blade forging after off-hand grinding operation illustrated at right.



Operator E. S. Jones semi-finishes jet turbine blade in off-hand grinding operation with cool-cutting, self-dressing Bay State grinding wheel.

# Thompson Ramo Wooldridge



Allen B. Hughes worked up through Bay State's Westboro plant and then added extensive field experience so that his knowledge of abrasive problems and practical solutions for them covers every phase of abrasive engineering.

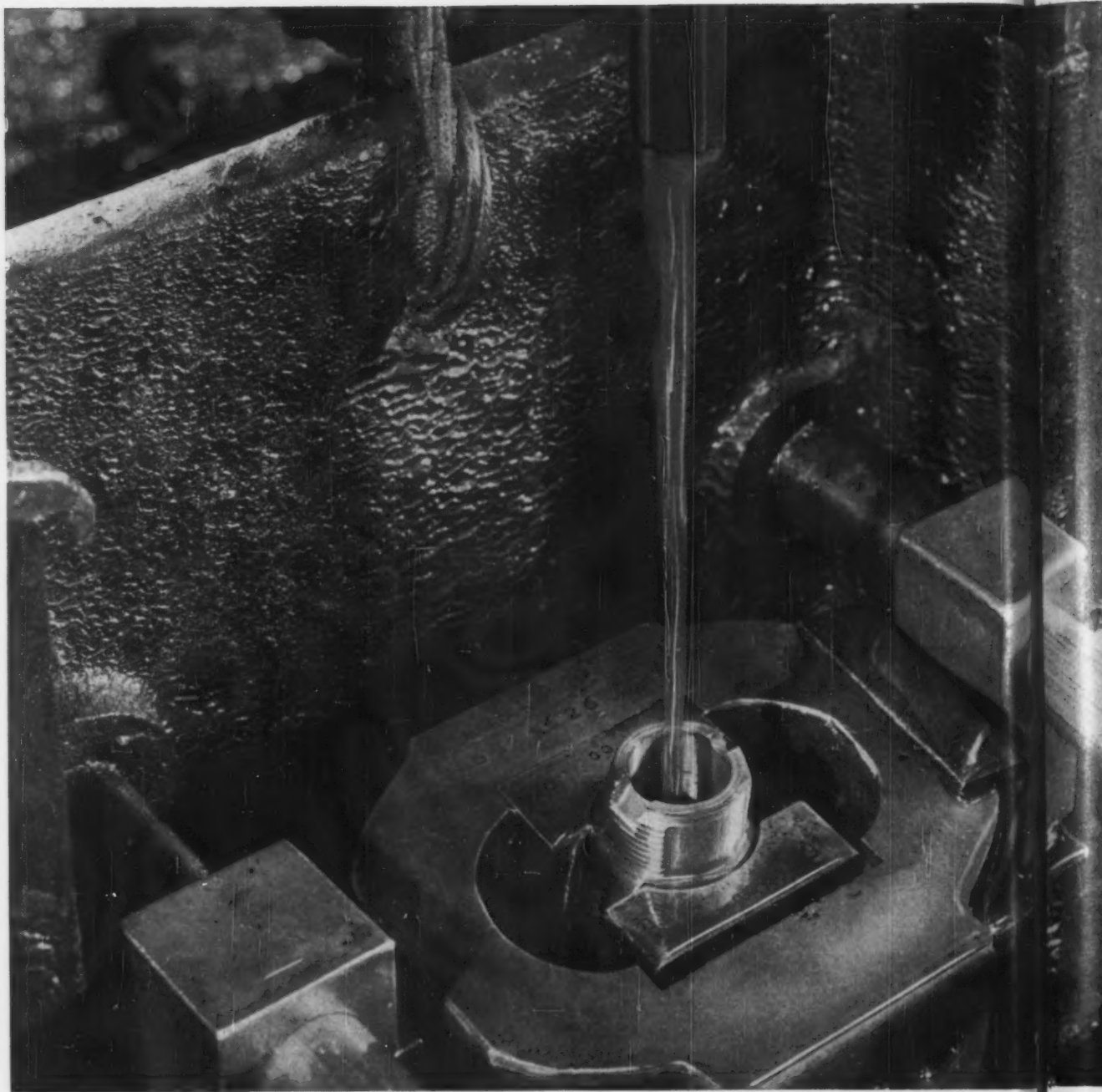
## BAY STATE ABRASIVES



Bay State Abrasive Products Co., Westboro, Massachusetts.

In Canada: Bay State Abrasive Products Co., (Canada) Ltd., Brantford, Ontario.

Branch Offices: Bristol, Conn., Chicago, Cleveland, Detroit, Pittsburgh, Los Angeles. Distributors: All principal cities.



Gulfcut 11A chosen for precision work and fine finishes at

## GULF MAKES THINGS

Ithaca Gun Company, Inc., of Ithaca, N. Y., makes the famous Model 37 Featherlight Repeater, Model 37 Rib Grade Repeater and Model 37R DeLuxe Repeater... all shotguns to warm the heart of any hunter.

Special steel barrels for these guns are reamed on a 12-spindle machine designed and built by Ithaca Gun engineers. Each gun barrel passes through three borings of

different sizes before the proper size choke is achieved. Chokes from .410 gauge to 10 gauge are obtained on this machine, which can bore 80 barrels per hour.

Says A. G. Stevens, Plant Superintendent: "Our gun barrels are reamed to very close tolerances, and they must have a silk-smooth finish. When you're doing precision work like this, cutting oils play a mighty impor-





Shotgun barrel boring machine, designed and built by Ithaca Gun engineers, has 12 spindles on each side. Machine can bore 80 barrels per hour with both sides running.



A. G. Stevens, Plant Superintendent, inspects a Model 37 Featherlight Repeater. Gulfcut cutting oil helps Ithaca Gun maintain the close tolerances essential for accurate firearms.

◀ Gun barrel is pushed up onto stationary reamer of special boring machine. Gulfcut 11A pours continuously over the boring area and is re-circulated through a filter system.

Ithaca Gun Company . . .

## RUN BETTER!

tant part. We've experimented with many different oils, but for our purposes Gulfcut 11A is the best of all."

See how Gulf makes things run better in *your* operation. Whatever type of machining you do, you'll find exactly the right cutting oil in the complete Gulfcut line. Send now for illustrated Gulfcut bulletins, or contact your nearest Gulf office.

### GULF OIL CORPORATION

Dept. DM, Gulf Bldg., Pittsburgh 30, Pa.

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- ☐ Gulfcut "Regular" Cutting Oils  
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Zone \_\_\_\_\_

State \_\_\_\_\_

IA-0129





Pittsburgh Steel's patterned sheet gives leather-appearance to the new custom furniture-styled L-1000 Laundromats shown here on way to final inspection.

*An Industry First . . .*

## Pittsburgh Steel Has Beauty of Leather On Westinghouse 'Furniture-Styled Twins'

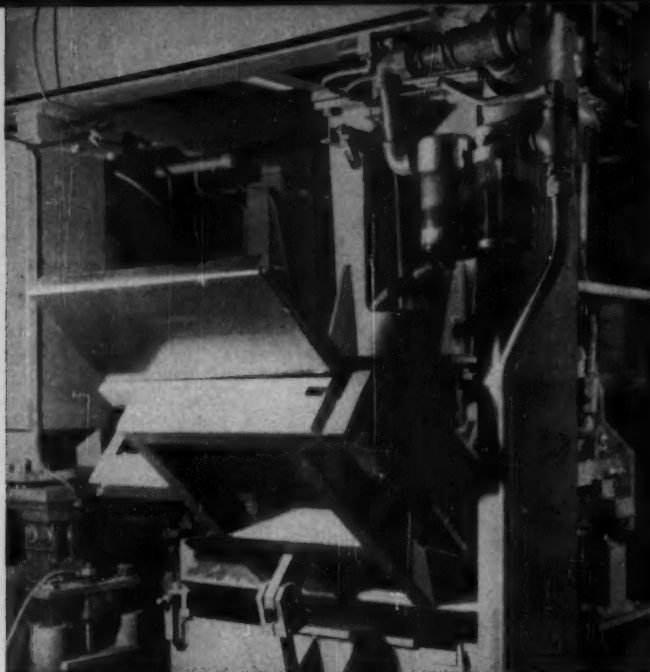


Soft, rich finish on a group of Laundromat shells is checked at one of the many quality inspection points. Close-up shows detail of the L-1000's pattern.





Fully as formable as Pittsburgh Steel's regular plain sheets, the new patterned sheets are put through Westinghouse's normal production process at Mansfield, Ohio.



Top quality in sheet, plain or patterned, is needed to serve Westinghouse's automated equipment. Here, patterned sheet is formed into the shell of the L-1000.

### First time pattern-rolled steel available in wide steel sheets

Wide patterned sheet steel—a new product and a Pittsburgh Steel Company “first”—has been put to work by Westinghouse Electric Corporation on its new line of custom “furniture-styled” appliances.

Wider than any patterned sheet available until now, the new sheet is designed and finished to appear like fine-grain leather. It's being used as the outer shell on Westinghouse's newly introduced L-1000 Laundromats and D-1000 automatic electric dryers.

**Pittsburgh Steel's Allenport (Pa.) Works is the steel industry's first producer of patterned, flat-rolled carbon steel in widths up to 48 inches—about twice the width previously available.**

Patterned sheet is available in coils or cut lengths, in either commercial or drawing quality. As flat, formable and drawable as Pittsburgh Steel's plain sheet, super-wide pattern-rolled steel goes through Westinghouse's regular production process without special machine changes.

Patterned sheets are given 27 piercings and notchings, in addition to a four-side flange. At Westinghouse, the rolled-in pattern emerges unmarred, even on corners and bends.

Next step is welding and then the sheet is formed into the appliance's

shell. After bonderizing, the shell gets a sprayed-on enamel coat which is baked. Soft wood-toned in color, the enamel helps emphasize the attractive, but rugged, leather-like finish.

• **Shape of Tomorrow**—But surface is only one quality standard Pittsburgh Steel meets. The Shape of Tomorrow theme in Westinghouse appliances requires clean, pronounced lines. As a result, bends and corners are sharper on the L-1000 and D-1000 models. This imposes extra requirements for uniformity of hardness so that the patterned sheets won't overbend or spring back.

Flatness specs must be met rigidly so that the finished appliance isn't plagued by an “oil-canning” effect.

Westinghouse has automated so much of its production sequence at the Mansfield, Ohio, plant that steel suppliers know gauge and dimension specs must be held rigidly. If they aren't, rejects and scrap losses would mount rapidly.

**Pittsburgh Steel's patterned sheets are performing so well at Westinghouse and in other ap-**

**plications that a promising future is being predicted for the product, especially in the automotive, appliance and building industries.**

Patterned sheets are suitable for any application where decorative appeal is needed, in addition to steel's strength, formability and economy.

Produced on one of the steel industry's most modern sheet mills, patterned sheet complements Pittsburgh Steel's full line of hot and cold-rolled carbon steel products.

Supplementing this product is cold-rolled strip steel produced by the Thomas Strip Division, Warren, Ohio, whose line also includes pattern-rolled strip—plain or with a variety of protective and decorative coatings. These include copper, brass, nickel and zinc.

If you are a manufacturer of a product made from flat-rolled steel, you can't afford to pass up potential improvements in your production process or the sales zip this imaginative patterned steel can give your product. Contact any of the district sales offices listed on this page.

## Pittsburgh Steel Company

Grant Building

Pittsburgh 30, Pa.



### DISTRICT SALES OFFICES

|         |           |         |              |              |
|---------|-----------|---------|--------------|--------------|
| Atlanta | Cleveland | Detroit | Los Angeles  | Pittsburgh   |
| Chicago | Dayton    | Houston | New York     | Tulsa        |
|         |           |         | Philadelphia | Warren, Ohio |





*For more than just a motor*

## **Solve your motor problems with**

You can make your job easier with Century Electric's complete line of fractional-horsepower motors. Here's how:

**Easy ordering**—You save time because you get answers to all motor problems from one source. This means you don't have to shop around for the motor you need. You name it—capacitor, jet pump,

unit heater, oil burner, brake, gear—any one you want, and in all types of enclosures too.

**Fast shipments**—From Century Electric's complete stock you can get a motor for any standard application. In addition, motors are packed in sturdy boxes so if you reship you know they'll arrive in good condition.





## Century's complete fractional line

**Application know-how**—You want to be sure you have the *right* motor for the job. And if you need expert help, you can get it from your nearest Century Electric sales engineer. He knows motors inside and out because he sells, applies and thinks motors day after day.

This is why you get *more* than just a motor

from Century Electric. You get a quality product, fast answers and engineering application know-how on motors up to 400 hp—all from one source.

### **CENTURY ELECTRIC COMPANY**

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*Century*  
58-19



# HIGHER BONDING STRENGTH

## WITH KAISER BASIC BRICK FOR THE STEEL INDUSTRY

Exceptionally high strength at critical intermediate temperatures (1400°F to 1850°F) ... that's the unique advantage you get with Kaiser unburned brick!

When the internal temperature of bricks in a furnace structure reaches the point where the chemical bond is destroyed, brick strength reaches its lowest point and cracking and spalling losses may result. In the chart, note the high crushing strength after firing in the intermediate range. This denotes strong bond at all temperatures — a unique feature of Kaiser unburned bricks.

### The Difference: Solid State Reaction

With Kaiser brick, there is no "liquid phase" in the formation of the ceramic bond. Kaiser's use of volatized silica (particles as fine as cigarette smoke) promotes a **solid state reaction** at lower temperatures which starts to form the ceramic bond **before** the chemical bond burns out. Result: **higher** bonding strength, **higher** resistance to thermal shock and mechanical abuse in furnace charging.

Solid state reaction also gives Kaiser brick outstanding resistance to distortion and shrinkage. Excellent resistance to chemical attack by furnace fumes, iron oxides and slags is assured by high MgO content, maximum brick density and chemically stable composition.

Make your own comparison tests and see how much more performance you get with Kaiser Basic Brick. And ask to see the new 30-minute color movie "Progress In Modern Basic Refractories." Your Kaiser Chemicals Sales Engineer or Regional Office will be glad to make the arrangements.

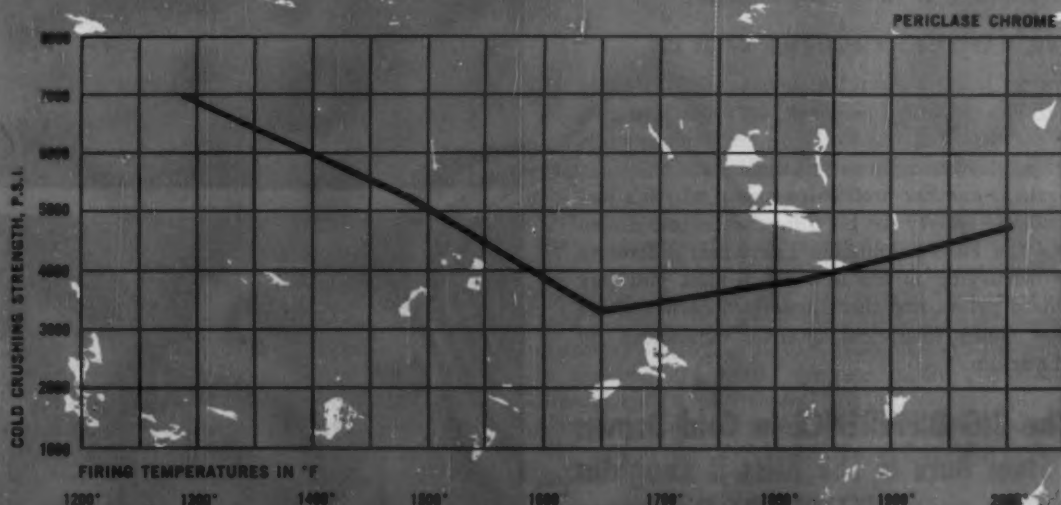
Call or write Kaiser Chemicals Division, Dept S9131, Kaiser Aluminum & Chemical Sales, Inc., at any of the regional offices listed below:

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HAMMOND, IND. . . . . 518 Calumet Building  
OAKLAND 12, CALIF. . . . . 1924 Broadway



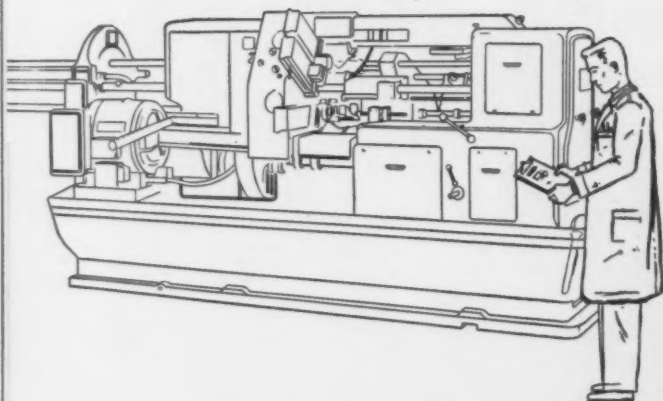
#### Pioneers In Modern Basic Refractories

Refractory Brick & Ramming Materials • K/R Gunning Systems • Castables & Mortars • Periclase • Deadburned Dolomite • Aluminas



# Why Lusterized® Bars Do

...NO PROCESSING GRIT, OIL



## Another Remarkable Benefit From Using Bliss and Laughlin's Patented LUSTERIZED® Finish Cold Drawn Steel Bars

The bright, clean finish of Bliss & Laughlin's Lusterized cold drawn carbon and alloy steel bars has more advantages than appearance alone.

One of the most enthusiastically mentioned is a very practical production advantage—the virtual elimination of the need to clean the chucking mechanisms of automatic bar machines between job set-ups.

This saves time and money. Production schedules run faster and smoother. From beginning to end, Lusterized bars start cleaner, work cleaner, finish cleaner.

### EXCLUSIVE, PATENTED FINISHING PROCESS

The secret is Bliss & Laughlin's exclusive, patented Lusterizing process which removes the processing grit, oils and lime that clog the chucking mechanisms. Just how this is avoided is explained at the right.

Here again is another profit-wise reason why it's just good business to specify the big difference in cold drawn steel bars—the Bliss & Laughlin Lusterized difference. Especially satisfying is the knowledge that you pay only standard prices, and that Lusterized bars conform to the new closer tolerances recently announced by Bliss & Laughlin.

**The BIG DIFFERENCE in Cold Drawn  
Steel Bars Is The Bliss & Laughlin  
LUSTERIZED® Difference**



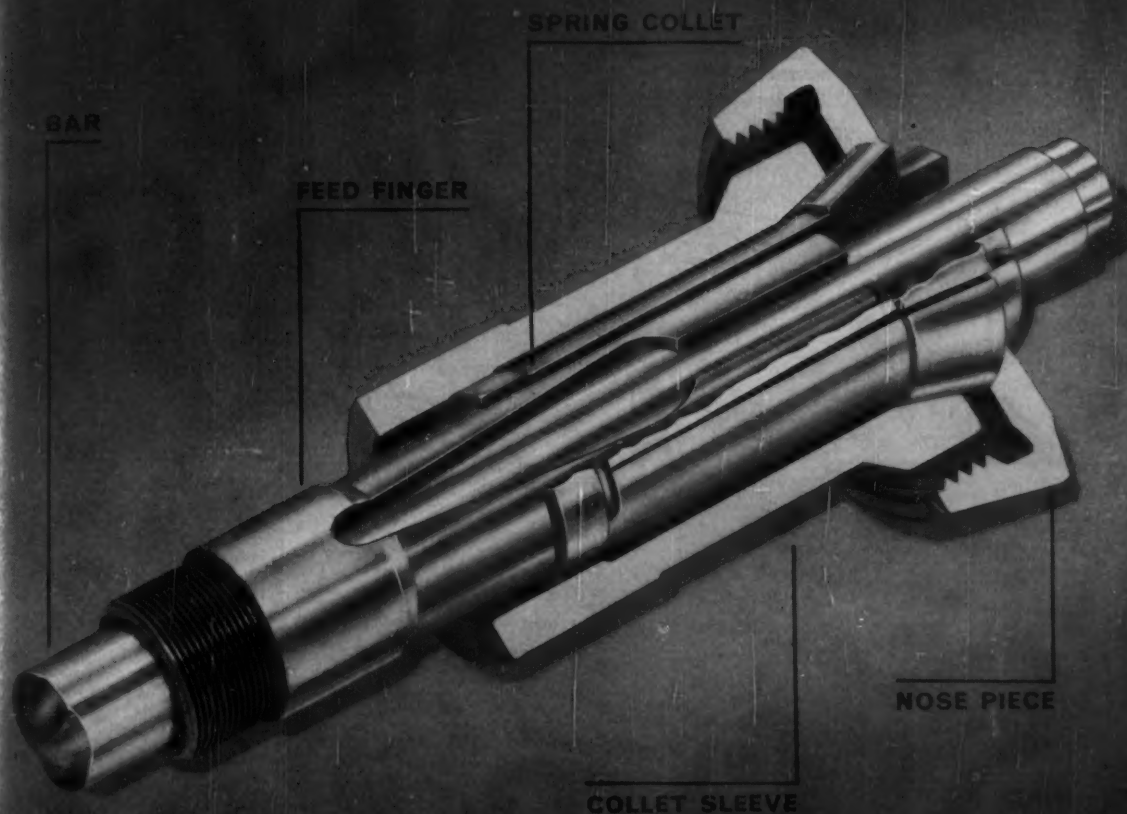
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sleeve  
severe

Origin



# Don't Clog Automatics

## OIL OR LIME TO FOUL CHUCKING MECHANISMS



The photo at the left above shows the production station of a single-spindle automatic bar machine. Familiar to all is the substantial time consumed in cleaning dirt accumulations from the chucking mechanism, caused by the scraping action of the feed fingers on ordinary cold finished bars during feed outs. The front and back slides, the circular form tools and the tool holders must first be removed. The nose piece then must be removed and finally the chucking mechanism, which includes the collet sleeve and the collet. On a multiple-spindle automatic, several hours can be consumed in this cleaning operation.

The illustration above shows why foreign matter in the chucking mechanism causes sluggish operation, sticking of the collet sleeve and run outs. During the feed out operation, the processing grit, oil and lime on ordinary bars is scraped off when the feed finger returns to the operating position. This dirt works through the openings in the feed finger into the slits in the collet and on through to the collet sleeve. Wiping ordinary bars before machining does not effectively eliminate the processing grit, oil and lime which the Bliss & Laughlin Lusterized process removes at the mill.

Originators of LUSTERIZED® Finish—The BIG DIFFERENCE in Cold Drawn Steel Bars

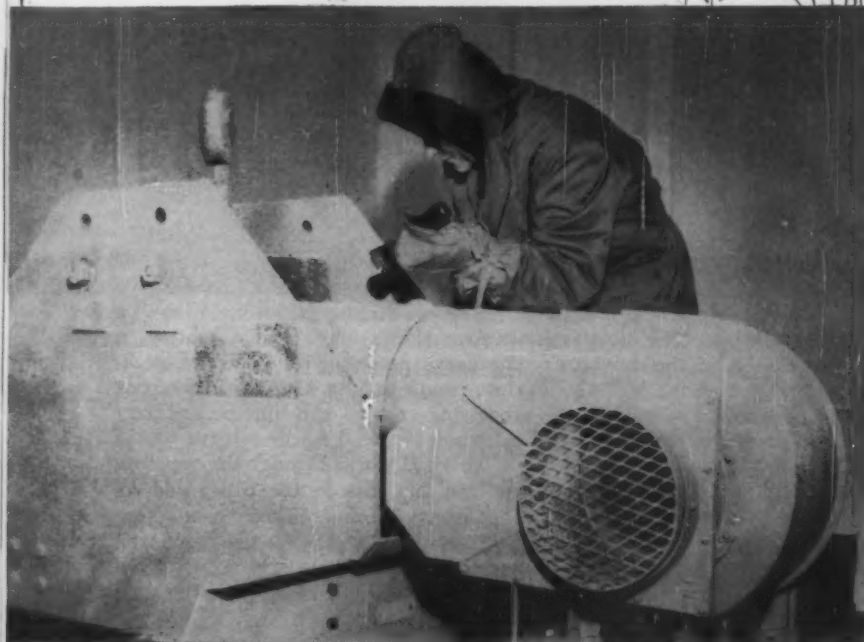
## BLISS & LAUGHLIN

GENERAL OFFICES: Harvey, Ill. • PLANTS: Harvey, Detroit, Buffalo, Mansfield, Mass.

Specialists in  
Finish, Accuracy,  
Straightness, Strength  
and Machinability



Where



**WE CONTROL THE WEATHER** in this special cold room in the laboratory to evaluate the performance of bearings, seals and lubricants—at temperatures from  $-50^{\circ}\text{F.}$  to  $+100^{\circ}\text{F.}$  We can also control humidity and wind velocity.

# tomorrow's machines get their bearings

**THE MOST MODERN DYNAMOMETER** in the bearing industry—with output torque of 30,000 Lb. Ft.—tests rear axles, transmissions, and other drive units, right here in the Timken Company's new physical laboratory. Modern electronic instruments swiftly and accurately record information on load, temperature, speed and efficiency. Besides the testing equipment shown on this page, there's a 7-speed deflection test machine. Equipment to study fretting corrosion. An electronic instrument development lab. Profilographs that measure surface accuracy to millionths of an inch. This new \$1,500,000 research center has 32,000 square feet to house the latest testing equipment helping to make

better and better bearings—solve your problems.

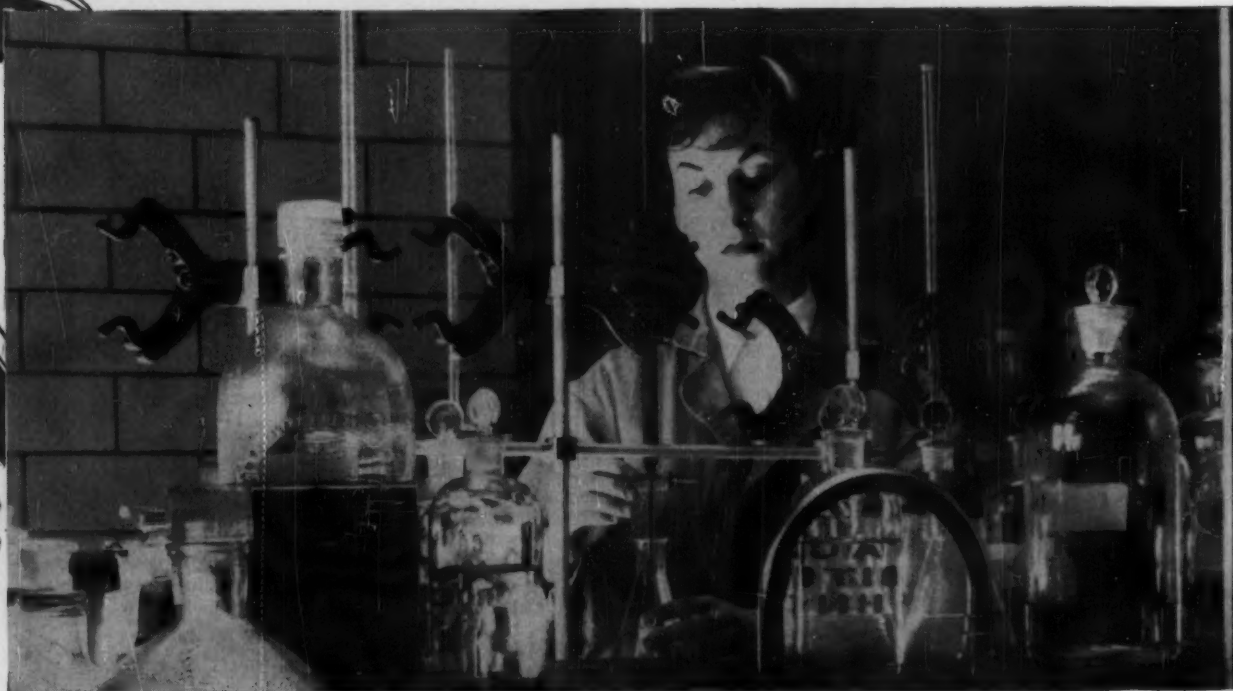
This new laboratory is the latest example of Timken Company pioneering. Pioneering that has made Timken tapered roller bearings first for 60 years. Our newest project is researching the realm of ultra-high bearing speeds and temperature. For more information, write The Timken Roller Bearing Company, Canton 6, Ohio.

Cable address: "TIMROSCO".

*Makers of Tapered Roller Bearings, Fine Alloy Steels and Removable Rock Bits.*



**60 YEARS OF LEADERSHIP 1899-1959**

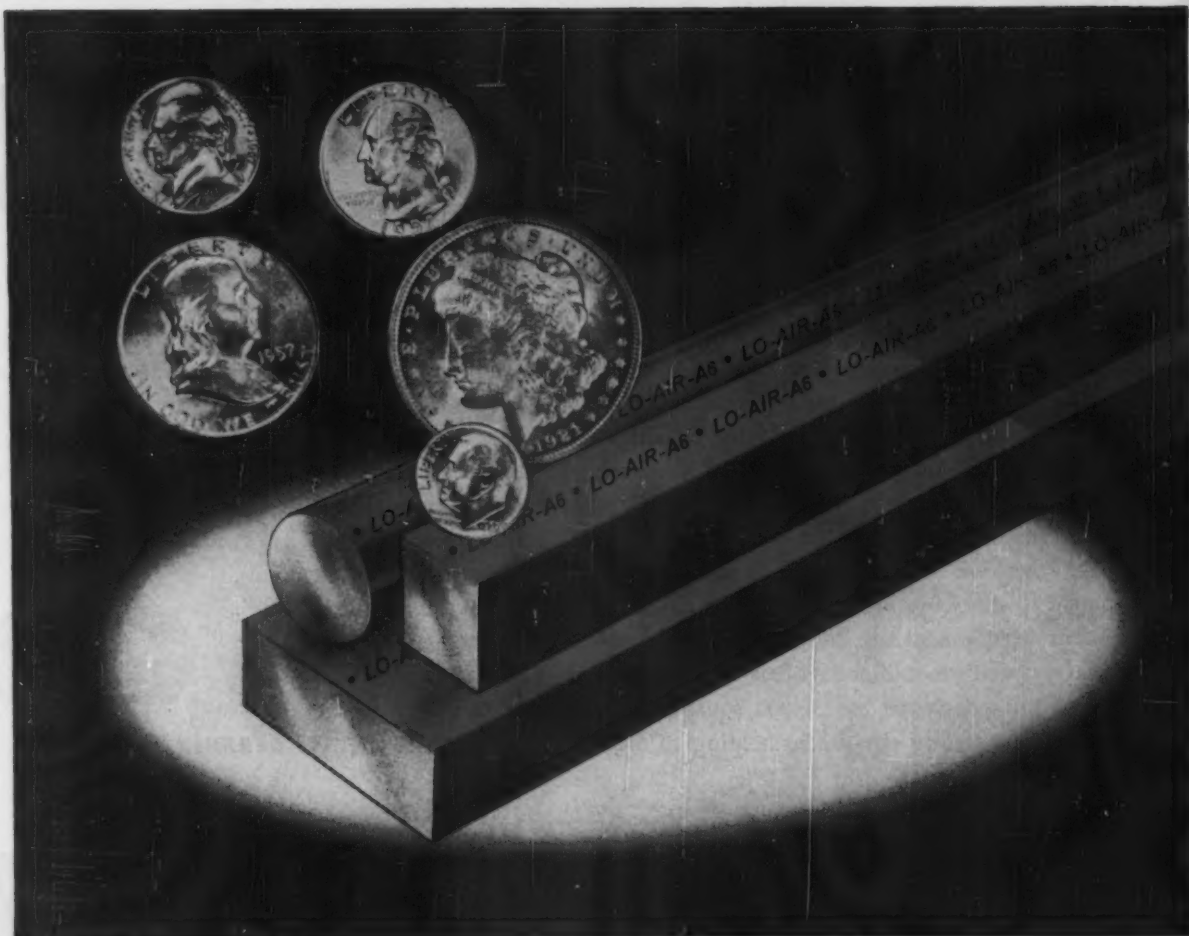


**WANT TO KNOW THE RIGHT LUBRICANT FOR YOUR EQUIPMENT?** This Lubrication Engineering Laboratory uses the latest techniques to compile an approved lubricant list for Timken bearing applications—a list that'll help manufacturers and users of machinery stretch their dollars.

**FIRST IN BEARING RESEARCH**

**TIMKEN®**  
**TAPERED ROLLER BEARINGS**





## THERE'S A BONUS IN EVERY BAR **LO-AIR** TOOL and DIE STEEL Gives You 4-Way Savings on Every Job

There's 75 years experience in specialty steels behind LO-AIR, Universal-Cyclops low temperature, air hardening tool and die steel. LO-AIR is remarkably free from distortion in hardening, sets new standards for machinability.

Check these four ways that LO-AIR can save you money, help you make more profit.

1. Excellent machinability—far easier than other air hardening grades of tool steels. Easier than oil hardening tool steel.
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furnace—no need to pay the high cost of high temperature hardening.

3. Less distortion during hardening, which reduces your finishing costs.
4. Maximum safety—possibility of cracking during hardening greatly reduced.

Write for brochure No. TS-101, or start your bonus savings now by ordering your requirements from your nearest Universal-Cyclops sales office or warehouse today! Complete stocks—rounds, flats, squares and billets—available for immediate delivery.

U. S. Pat. No. 2,355,224

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**CYCLOPS**  
STEEL CORPORATION  
BRIDGEVILLE, PA.

TOOL STEELS • STAINLESS STEELS • HIGH TEMPERATURE METALS





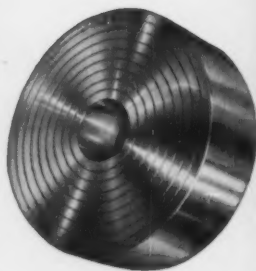
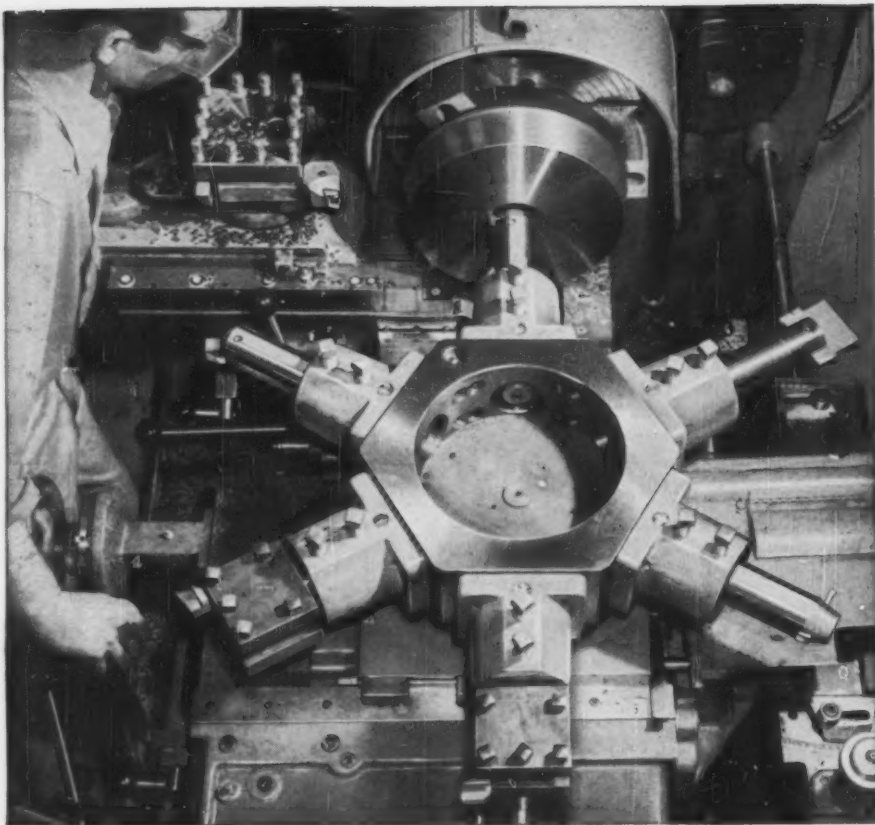
## *Put this truck to work . . . without buying it!*

For many companies, even the savings resulting from the use of the *right* equipment is overshadowed by the capital investment necessary. The logical answer, in such a case, is to lease.

Without tying up a cent of working capital, the Clark Lease Plan permits you to select materials handling equipment from the world's *most* complete line. No down-payment or outside financing is necessary, and you have the added advantage of dealing directly with your local Clark dealer.

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**CLARK**  
**EQUIPMENT**



## Expert setup gets more work per chucking

**How manufacturer uses C/F turret lathe to produce variety of chuck bodies with only one tool change**

To do the job, the manufacturer selected a Gisholt 1L Saddle Type Turret Lathe with a cross-feeding hexagon turret. A 15" 3-jaw air chuck holds down chucking time. One set of adjustable serrated jaw bases handles the different workpiece sizes for first machining operations. A quick-indexing square turret on the cross slide carries turning, facing and chamfering tools, which work simultaneously with tools on the hexagon turret.

Three stub boring bars on the hex turret bore, counter-bore, recess and back face. Because size is set with the cross-feeding turret, these same boring bars are used on different part sizes. Also on the hexagon turret are 2 box-type tool posts for facing, boring or recessing—used for different size workpieces because of the cross-feeding

feature. A threading attachment lets the manufacturer thread the hubs, and a taper attachment handles up to 8 inches taper per foot when required.

The sixth tool on the hex turret, a spade cutter, is used for final sizing and is the only special tool changed for each job.

Simple, low-cost tooling combined with the cross-feeding hexagon turret offers maximum efficiency in handling various sizes of similar parts. The rugged Gisholt MASTERLINE Saddle Type Turret Lathes have the speeds, feeds and power to complete the work in the least amount of time. Call your Gisholt Representative today, or write Gisholt for literature.



# GISHOLT

MACHINE COMPANY

Madison 10, Wisconsin, U.S.A.

**WRITE TODAY** for complete set of Gisholt MASTERLINE Saddle Type Turret Lathe Bulletins.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • PACKAGING MACHINES • MOLDED FIBERGLAS PLASTICS

# WAGNER Integral-Type Gearmotors



Wagner Integral-Type Gearmotor with TEFC motor. Standard or explosion-proof.

Wagner Integral-Type Gearmotor with open protected motor.

## For the Power you want - At the Speed you need !

Wherever you need "slower than motor speeds" you can get positive speed reduction with plenty of power by using Wagner Gearmotors.

This extension to the Wagner line provides compact motorized drives, with both motor and gear housing of corrosion-resistant cast iron. Available with the latest NEMA Frame open protected or totally enclosed fan-cooled motors, they combine Wagner motor dependability with rugged, simplified gear units to give you speed reduction equipment designed for greater capacity and longer life in ordinary up to rough service.

Wagner Gearmotors offer a wide variety of sizes in single, double, triple or quadruple reductions—horizontal or vertical foot or flange mountings—speeds from  $7\frac{1}{2}$  to 780 RPM. Write for Bulletin MU-227.

Whether you specify or apply power transmission equipment, your nearby Wagner Sales Engineer will be glad to help you select the right drive for your applications. There are Wagner Branches in 32 principal cities.

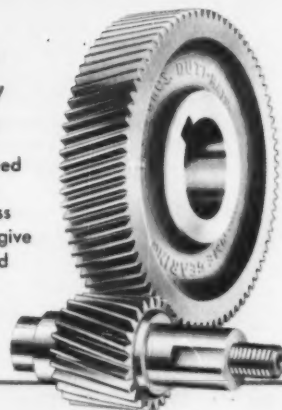
### Wagner Electric Corporation

6400 PLYMOUTH AVENUE, ST. LOUIS 14, MISSOURI

#### WAGNER SPEED REDUCTION EQUIPMENT

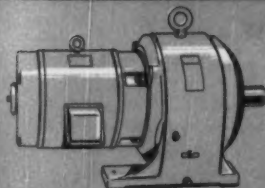
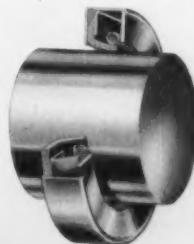
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Gears are hardened after cutting, for maximum hardness and accuracy, to give extra capacity and longer wear life.



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Improved lip type seals are used on horizontal shafts. On vertical output shafts, double mechanical seal with slinger and drain-off gives positive protection against leakage.



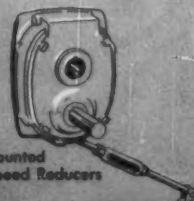
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All-motor Gearmotors



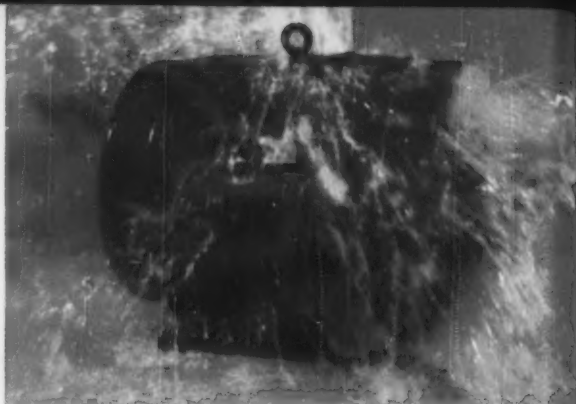
Speed Reducers



Shaft-mounted Speed Reducers



**DOUBLY PROTECTED.** Air intakes and outlets protect against falling or splashing liquids. Cast iron frames protect against rough handling and corrosion.



**TYPE DP · Doubly Protected  
against corrosion · against  
falling or splashing liquids**

These motors give the double protection of corrosion-resistant cast iron frames and drip-proof enclosures that are so well designed that they can be used in many applications that formerly required splashproof motors. Available with ball bearings, or with high load carrying capacity sleeve bearings for extra quiet operation. Write for Bulletin MU-223.

**1 TO 125 HORSEPOWER - 1750 RPM - 40° C - NEMA FRAMES 182 THROUGH 445U**

**You get less downtime, lower upkeep, with  
WAGNER PROTECTED-TYPE MOTORS**

If you need motors that will keep production rates up . . . that will give you the continuity of service you want . . . that will operate with complete dependability under the most severe conditions in their specific applications—use Wagner Protected-Type Motors. These motors pack extra power into little space, are light in weight, and are easy to maintain.

Let your Wagner Sales Engineer show you how these protected motors can bring you savings in initial motor costs, maintenance costs, and in continuity of operation.

**Wagner Electric Corporation**  
6400 PLYMOUTH AVENUE, ST. LOUIS 14, MO., U. S. A.

WM59-10

**1 TO 100 HORSEPOWER - 4 POLE - 60 CYCLE - NEMA FRAMES 182 THROUGH 445U**

**TYPE EP · Extra Protected  
against corrosive or  
abrasive elements**

Wagner Type EP Motors are totally-enclosed, fan-cooled—for complete protection against dust, abrasives, fumes, steel chips or filings. Type JP is explosion proof as well—designed and approved for use in explosive atmospheres. Cast iron frames protect against corrosion and ribs on the frames add mechanical strength and increase the surface cooling area. Effective cooling system adds to motor life. Write for Bulletin MU-224.



**SECURELY SEALED FOR LOW MAINTENANCE.** Both ends of these motors have running shaft seals to keep the heavy duty bearings clean. Bearing housings are effectively sealed to prevent escape of grease. Openings are provided to permit relubrication that adds years to motor life under severe conditions.

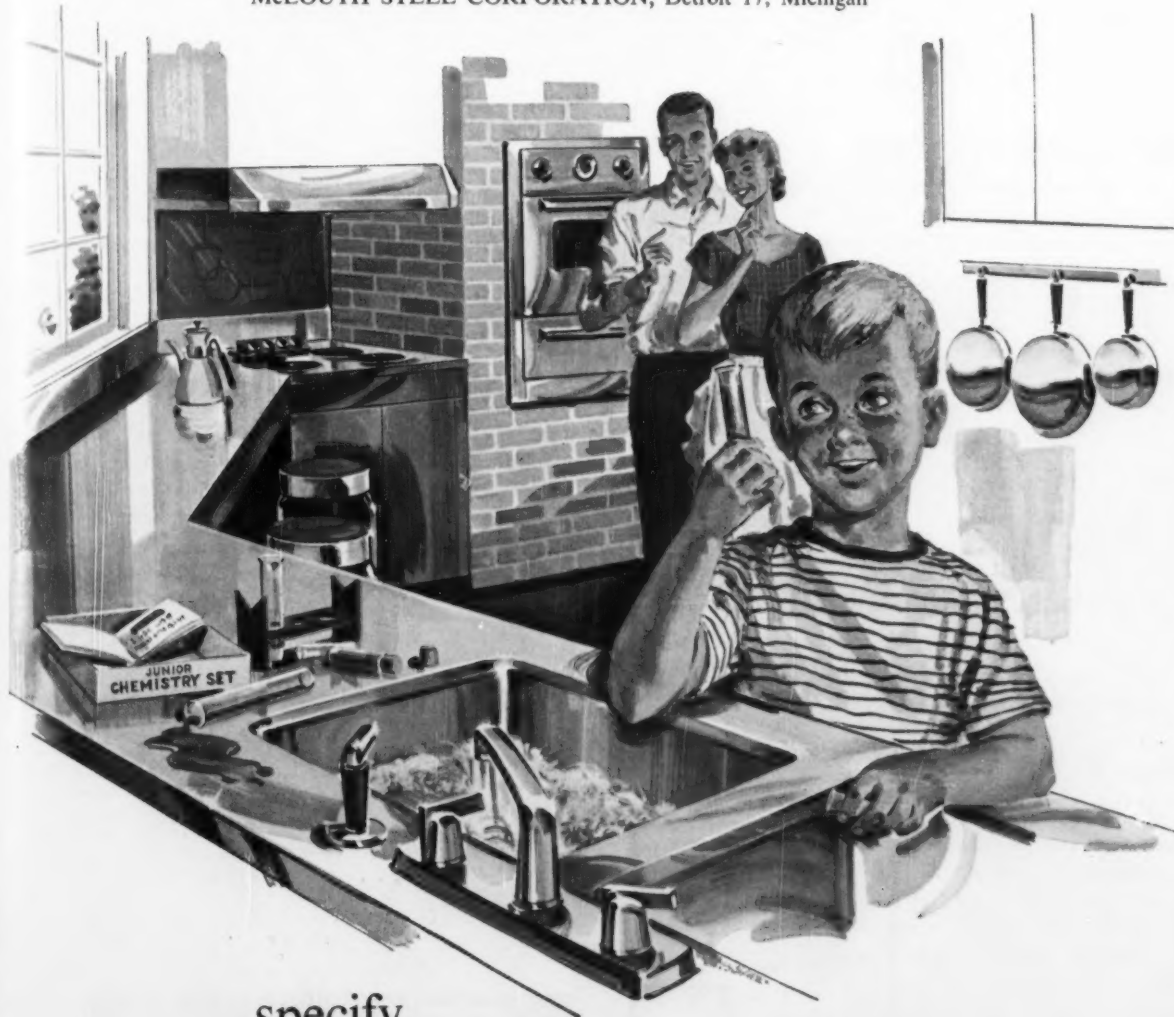


# carefree is stainless steel

The gleaming efficiency of Stainless housewares is a joy to every woman. Everything made of Stainless Steel cleans with ease, lasts a lifetime and brightens-up the home.

No other metal offers the freedom of design and fabrication, economy of care and the durable beauty that serves and sells like Stainless Steel.

McLOUTH STEEL CORPORATION, Detroit 17, Michigan



specify

**McLOUTH STAINLESS STEEL**

HIGH QUALITY SHEET AND STRIP

for homes and home products



# Techline advances new concept of supplies services for precision finishing industry

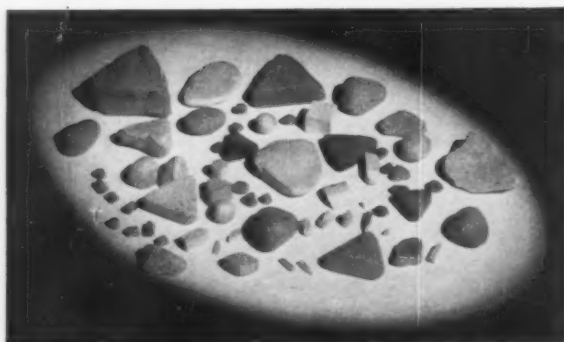
Only Techline offers you all your supplies for both the wet blast and barrel finishing processes from one convenient and dependable source.

**Dependable**—because Techline media, Chempounds and abrasives are manufactured expressly for precision barrel finishing and wet blasting. They are unsurpassed in their ability to speed production and cut finishing costs.

**Convenient**—because you can combine your purchases and cut costs through Techline's quantity prices, prepaid freight allowances, and rapid delivery.

## For Barrel Finishing

Techline engineers have evolved new finishing techniques based on Wheelabrator Corporation's unequalled knowledge of cleaning and finishing processes, and utiliz-



ing the newest abrasive media and compounds. They are carefully selected for quality and uniformity and are formulated to achieve precisely the results you require.

## For Wet Blasting

Techline Liquamatte equipment and supplies are well established as the most successful means of achieving precision finishes in wet blasting. Additives such as Anarust and Anaset, and newly-developed protective coatings for the finished work, assure you of optimum results in every application of Techline wet-blast equipment and Liquabrasives.



Techline shatters an industry's traditions — makes precision finishing a science.

## New packaging developed for Techforms and Chempounds

For maximum convenience of handling and storage in your finishing department, Techline offers Techforms, Techangles and Chempounds in sturdy 50-lb. cartons as well as 400-lb. bulk containers. From a practical standpoint, carton packaging of Chempounds assures you of peak potency and freshness, since smaller quantities are exposed at a time. All Chempounds are compounded and packaged to order, to arrive in prime condition.



## How you can use Techline's sample processing service

Techline is prepared to prove the savings you will realize through use of Techline barrel finishing or wet blasting equipment and supplies. Techline engineers will make a test demonstration in our modern laboratory, using actual samples of your production parts. You may send sample parts for analysis and testing without cost or obligation.

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Your local Techline sales engineer will provide samples of Techline media and Chempounds to try in your own production. And he will arrange for a demonstration or sample test in our laboratory. Or, for detailed information and supplies prices immediately, write to Techline at Vicksburg, Michigan.

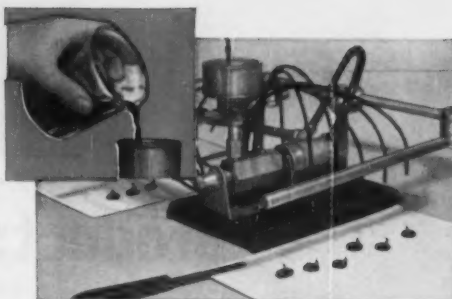


2450 Avenue V, Vicksburg, Michigan

Bertsch & Co. finds solution to lubrication problem...with Standard Oil's

# RYKON Grease R

*Centralized lube system pumps grease through 80 ft. lines in cold temperature; no clogging*



Lab demonstration shows how RYKON Grease R works. Grease is poured into reservoir as a fluid. The shearing action exerted by pump and outlets irreversibly converts fluid to a grease. Grease is ejected from outlet lines.

**Problem:** Bertsch & Company, Cambridge City, Indiana, makes pinch rolls and other metal bending equipment. A centralized lubrication system used on one pinch roll model had to pump grease 80 feet. Greases tried could not be pumped this distance without clogging lines. Since machines are shipped all over the world and are often in operation in cold climates, Bertsch had additional problems. The grease had to be pumpable in cold temperatures. It had to be foolproof so that customers beyond the reach of service calls would experience no problems.

**What was done:** Bertsch turned to Standard Oil for help. Standard Oil man, D. M. Simmons had the answer:

**RYKON Grease R.** This is a rheopectic grease, one that flows like an oil. Its rheopectic properties cause it, under slight shearing stresses, to turn to a thick, durable grease. RYKON Grease R flows to the pump as a fluid, lubricates the bearings as a grease.

**What you can do:** Maybe you manufacture equipment that needs a centralized lubrication system and you have been looking for a grease like RYKON R. Get the facts about RYKON Grease R from your nearby Standard Oil lubrication specialist anywhere in the 15 Midwest and Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 South Michigan Ave., Chicago 80, Illinois.**



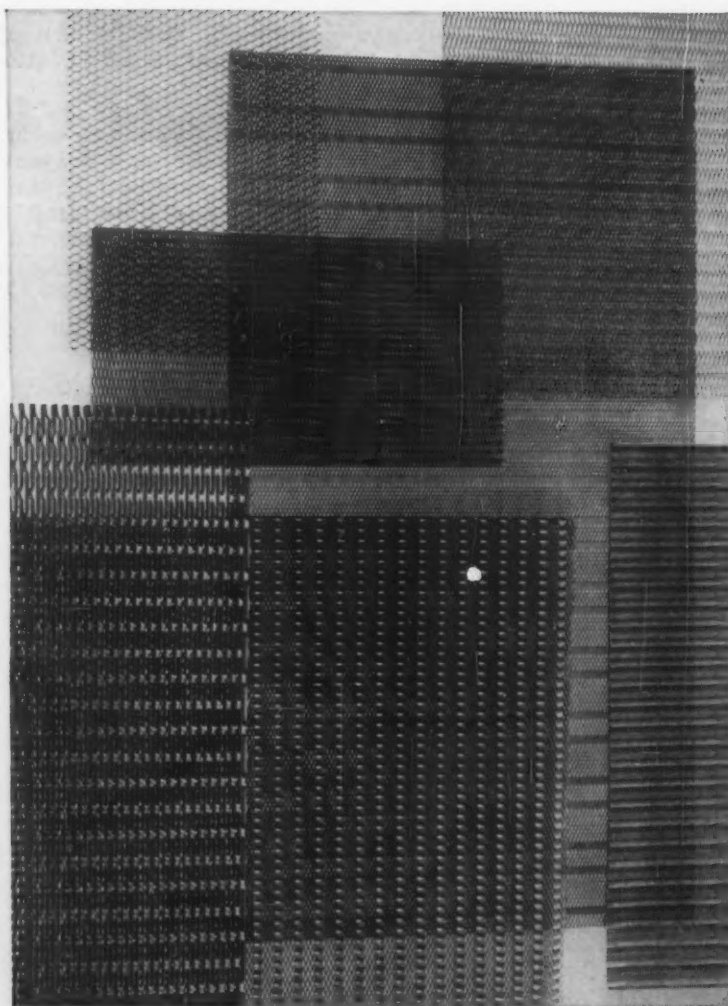
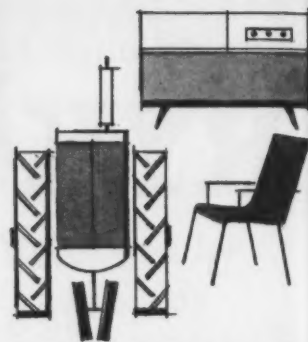
You expect more from **STANDARD** and you get it!



Sons of founder, Harry E. and Robert O. Bertsch talk with Standard Oil lubrication specialist Donald M. Simmons. Don is well qualified to work with customers on difficult lubrication problems. He has the training and experience for it. Don graduated from Purdue. He has seven years service with Standard. He has completed the Standard Oil Sales Engineering School.

*Inland "job-tailored"  
Cold Rolled Sheets work better*

**product:** EXPANDED  
METAL



**problem:**

the production of expanded metal panels for a wide variety of products ranging from automobiles to air conditioners, tractors to phonographs, stoves to patio furniture, television receivers and lawn mowers. These to be fabricated from decorator designs in an almost limitless range of complexity. Equipment, created specifically for the purpose, functions at highest efficiency and economy with coil steel which is cut and expanded. The often enormous stretch of quite narrow strands could cause breakage and rejection of the entire piece.

**solution:**

the problem presented was overcome by "job-tailored" Inland Drawing Quality Aluminum-Killed Steel. The steel not only took punishment of severe expansion and pattern formation, but provided an excellent surface for all subsequent finishing operations.

**INLAND STEEL**

30 West Monroe Street, Chicago 3, Illinois

Sales Offices: Chicago • Davenport • Detroit • Houston • Indianapolis  
Kansas City • Milwaukee • New York • St. Louis • St. Paul



*Cold  
Rolled  
Sheets*



ST. LAWRENCE SEAWAY will have good and bad points for American industry.

It will enlarge the world market potential of many companies. But it will also sharpen competition of foreign companies in the United States.

FEWER BUT BETTER MISSILE MAKERS. That's the prediction of a Government authority in this field. He likens the missile business today with the auto industry of 40 years ago. He says only the best companies will survive the competition.

ALUMINUM CANS WILL COMPETE seriously with tinplate cans within the next ten years, according to F. B. Newcomb of American Can Co. Mr. Newcomb says economics and other problems are now a handicap to aluminum in the can business. But his company is willing to spend money on research to make aluminum competitive.

BUSINESS UPSWING IS CONTINUING, says the Dept. of Commerce. Commerce reports Gross National Product in the first quarter reached a seasonally adjusted annual rate of about \$465 billion. It was \$453 billion in the last quarter of '58 and \$427 billion in the first quarter a year ago. GNP level in April was higher than in the first three months.

INDUSTRIAL FURNACE BUSINESS is getting better. Industrial Heating Equipment Assn. announces new orders in March were more than \$6 million. That's a 125 pct increase over February volume.

SCREW MACHINE PARTS MAKERS look for a good business year. Sales are expected to hit \$500 million, which would make '59 the best peacetime year in history.

STEEL INVENTORIES will not be excessive on July 1, possible strike deadline. This word comes from Marcus J. Aurelius, administrative vice president, U. S. Steel Corp. Mr. Aurelius warns that steel use will be up 11 pct in first half. And the outlook is for steel consumption to continue moving up in second half.

SMALL STEEL FABRICATORS feel they are in a particularly bad position to follow the basic steel wage pattern this year. But there is not too much hope for a major break. Supreme Court has ruled a company must open its books to the union if it resists demands on the ground of inability to pay.

PATENTS ON IMPROVED LEAD OR ZINC PRODUCTS obtained by either metal association will be licensed on a non-exclusive, unrestricted basis, says Schrade F. Radtke, director, lead-zinc research.



View of the huge Cleveland Worm and Gear set used in this 150 Series All-Steel Shear, built by The Cincinnati Shaper Co.

## CLEVELAND gearing helps this giant shear 1½" steel plate

**T**HE terrific pressures generated in cutting a 1½" steel plate 12 feet long are as nothing to this giant shear. Reason: Because there is plenty of extra power, transmitted through Cleveland Worm Gearing.

Whenever a drive must operate under extreme pressures, there you'll find Cleveland Worm Gearing at its best. And a Cleveland drive stays dependably on the job no matter how severe the service. It doesn't wear out—its efficiency actually improves with use.

Write for Bulletin 145 which illustrates the many types and sizes of units available in Cleveland Worm Gear Speed Reducers and Drives. Our sales representative near you will sit down with you at your convenience to analyze your drive problems and help you select Cleveland's best suited to your needs. The Cleveland Worm and Gear Company, 3282 East 80th Street, Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers, Limited.

# CLEVELAND

Worm Gear

*Speed Reducers*



# Senate Hearing Deepens Gloom In Steel Labor Crisis

**Both sides are adamant as contract bargaining date approaches.**

**Basic differences are spotlighted at Senate hearing on price notification bill.—By Tom Campbell.**

■ Steel labor leader Dave McDonald and steel industry leader Roger Blough agreed last week that Senator O'Mahoney's pre-price increase notification bill was a bad thing. But from that point on any semblance of agreement ended.

Treated with kid gloves by Sen-

ators O'Mahoney and Kefauver, Mr. McDonald spent little time testifying about the bill itself. He used the Senate Antitrust Subcommittee hearing as a sounding board for an attack on the steel industry's wage position. Boiled down, Dave insisted that the steel industry ought to hold prices and at the same time give the steel workers a raise with additional fringe benefits.

## **Behind McDonald's Opposition**

—Mr. McDonald opposed Senator O'Mahoney's price notification bill because he felt that in the process of investigating the steel industry (if it wanted to raise prices) collec-

tive bargaining would be adversely affected. Citing impressions from his recent visit to Australia the steel labor chief made it clear he is afraid passage of the bill would tie up labor raises months or even years.

Mr. Blough opposed the bill with some of the strongest language used in recent years by such an outstanding industrialist. His language was a measure of Roger Blough's personal and official rejection of the philosophy contained in Sen. O'Mahoney's proposal. Mr. Blough's castigation of the proposed bill was so strong and picturesque that it ap-



**DAVE McDONALD:** Raise wages, but not prices.



**ROGER BLOUGH:** Higher wages mean more inflation.



## 1959's Union-Management Crisis

This interpretative article by Tom Campbell, editor-in-chief, *THE IRON AGE*, is based on testimony of steel labor and management before the Senate Antitrust Subcommittee.

Testimony was primarily in opposition to a bill requiring notification of intent to increase prices. But the hearing also served as a sounding board for labor-management viewpoints over the forthcoming steel labor contract talks.

parently caught the Senator by surprise.

**Senatorial Wrath**—One result of the steel chief's blast came later in a scathing denunciation of Mr. Blough's thinking by Sen. O'Mahoney. The Senator's reaction to Roger Blough's pulverization of his bill was that of an outraged artist who thinks his creation was of the best, for the best purposes, and fitting current conditions precisely.

Sen. O'Mahoney in a voice filled with emotion flatly accused Roger Blough of filing nothing but misconceptions with the committee. He challenged Mr. Blough to find in the bill one proof of anything that was contained in his (Mr. Blough's) statement. After a heated wrangle with various attempts by Mr. Blough to be heard, the argument was a draw. Mr. Blough stuck to his guns, took full responsibility for what he said, insisted that the bill would amount to price control and indicated it would spell the end of free enterprise as we see it today.

**A Losing Battle**—Mr. Blough's attempt to get the subcommittee to even recognize that labor costs were responsible for inflation was a complete failure. Not because the steel

chief failed to make labor's responsibility clear by speech, chart, and explanation but because both Sen. O'Mahoney and Sen. Kefauver reacted as if there was no reason for inflation except price increases. Once or twice Sen. Kefauver appeared to be aware of wage increases as a cause of inflation but at no time did Sen. O'Mahoney stop harassing Mr. Blough long enough, to even mention the word labor.

The gist of the goings on at the subcommittee hearing is quite important: The steel labor union and the steel industry are more adamant in their positions about wage demands than ever before. Not only that but never before had there been such a cleavage so far ahead of down-to-earth collective bargaining sessions. Nor has there ever been a time when so many in government were trying to negotiate the contract for the steel industry and the union.

**Antitrust Observer**—It was clear from this "hearing" that the main purpose aside from taking testimony on the bill was to focus attention on the steel labor hassle coming up. Another sidelight unnoticed by most people at the hearing: the chief economist of the Antitrust Div. of the Justice Dept. attended the hearings. He took copies of all releases, took notes on the testimony and evinced considerable interest in all points of Mr. Blough's testimony. This, according to Washington correspondents, was a trifle unusual because normally the Justice Dept. waits until the full record is taken and then studies the testimony, exhibits and conclusions.

Dave McDonald, either as a slip or to make his point, said that the union was "having trouble holding some workers at work." This could have been a preview of possible quickie strikes later. Or it may have been Dave's forensic ability running away with itself.

**McDonald Is Critical**—Dave McDonald also took a crack at the current steel industry labor negotiators. He called them new men who did not know how to handle the labor union like the Fairlesses did,

a reference to Benjamin Fairless, former chairman of U. S. Steel. The reaction one got from this blast was that Dave and his people do not know too much about the group which will go to the mat with them soon on the steel contract—if the government will allow them to do so unhindered.

Mr. Blough's testimony and a study of his remarks suggests that he does not favor **any** steel price increase and that U. S. Steel will hold the price line if circumstances permit it to do so. No one in or out of the steel industry wants to go into "circumstances." But it is clear from the testimony by Messrs. McDonald and Blough and from the remarks of the various Congressmen at the hearing that "circumstances" mean different things to different people.

**Crux of the Battle**—U. S. Steel probably would not raise prices if there were no wage increase that would require a price increase. Mr. McDonald insists that the union is "entitled" to wage and fringe benefits. Congressmen insist that industry shall not raise prices, with no emphasis at all on labor; except to vaguely hint that it is entitled to productivity gains.

Judging from that frame of mind and the strong position taken by the steel industry—and last week by Roger Blough—there is not going to be an easy labor settlement. From Mr. Blough's defense of profits and his assertion that the steel industry is not making too much profit, coupled with his feelings about the sharp increase in labor's share of the national income it is not likely that his firm will agree to any wage increase along Mr. McDonald's pattern without a price increase.

**Must Union Strike?**—Since the steel officials do not want to see a price increase, and since none of them want to see their financial structures impaired, the union will have to strike to get the kind of demands it is talking about publicly and privately.



# Call for Sanity in Steel Buying

## Avoid Inventory Extremes, Steel Executive Urges

**U. S. Steel's Marcus J. Aurelius says inventory excesses are harmful and expensive.**

**He sees a chance for steel users to level out inventory cycles.—By G. J. McManus.**

■ What should a purchasing agent do if there is no steel strike? If there is a strike, what course should the buyer take at the end of it?

Surprising answers to both questions came last week from Marcus J. Aurelius, administrative vice president, United States Steel Corp. Backing up his statements with figures long held top secret by U. S. Steel, Mr. Aurelius offered Pittsburgh buyers these thoughts:

1. Steel inventories won't be excessive July 1.
2. If there is no strike, sharp cutbacks in July and August orders would "probably be the most dangerous decision any steel consumer could make."
3. If there is a steel strike, users should avoid wild buying at the end of it.

**Here's Why**—Basic thinking behind this advice is that inventory excesses are directly harmful to individual plants and cause indirect damage by rocking the steel industry and the whole economy.

In the present situation, Mr. Aurelius feels there is danger an early steel settlement could bring extreme action on inventories. He does not try to minimize the present buildup; U. S. Steel estimates 8 million tons will be added to steel stocks in the first half. The steel stockpile on July 1 is expected to top 20 million tons.

**Users Will Be Busy**—However, Mr. Aurelius points out that steel consumption will jump by 11 pct

in the first half. The July accumulation will be only slightly larger than current usage warrants. And the outlook is for steel usage to continue its climb in the second half.

"National industrial output, already above previous peaks, will set new records in the second half of 1959 and continue to advance in 1960," says Mr. Aurelius.

**"Don't Liquidate"**—He looks for some inventory liquidation in the third quarter but he feels it would be unwise for plants to go against the rising tide by slashing steel orders in July and August.

"Steel use will be at a seasonal high in those months and it will prove to be the smart steel buyer who continues to purchase steel to meet consumption needs."

**The Outlook**—If there is no strike and liquidation is moderate,

Mr. Aurelius expects steel output to drop in the third quarter and then rebound in the fourth. He looks for ingot production to hit 115 million tons or better for the year.

If there is a strike, he fears that the forced liquidation will be followed by "another erratic surge of stock building when the strike eventually ends."

**Need for Restraint**—He calls for restraint on the part of purchasing men in any post-strike buildup. If steel stocks are raised to new peaks, he sees the inevitable reaction bringing another deep slump for the steel industry.

"What I am suggesting is that we concentrate on controlling this inventory cycle . . . that we slice off some of the peaks and fill in some of the valleys," says Mr. Aurelius.

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## The Steel Market Dilemma

Statistics show that steel users have whipsawed themselves and the mills by inventory excesses. The need for moderation shows up in these facts:

**1. The consumption rate of steel has never exceeded 90 pct of capacity in the past 10 years.**

**2. Steel shortages have been largely caused by inventory excesses. In most recent periods plants have either been building above normal requirements or cutting below minimum levels.**

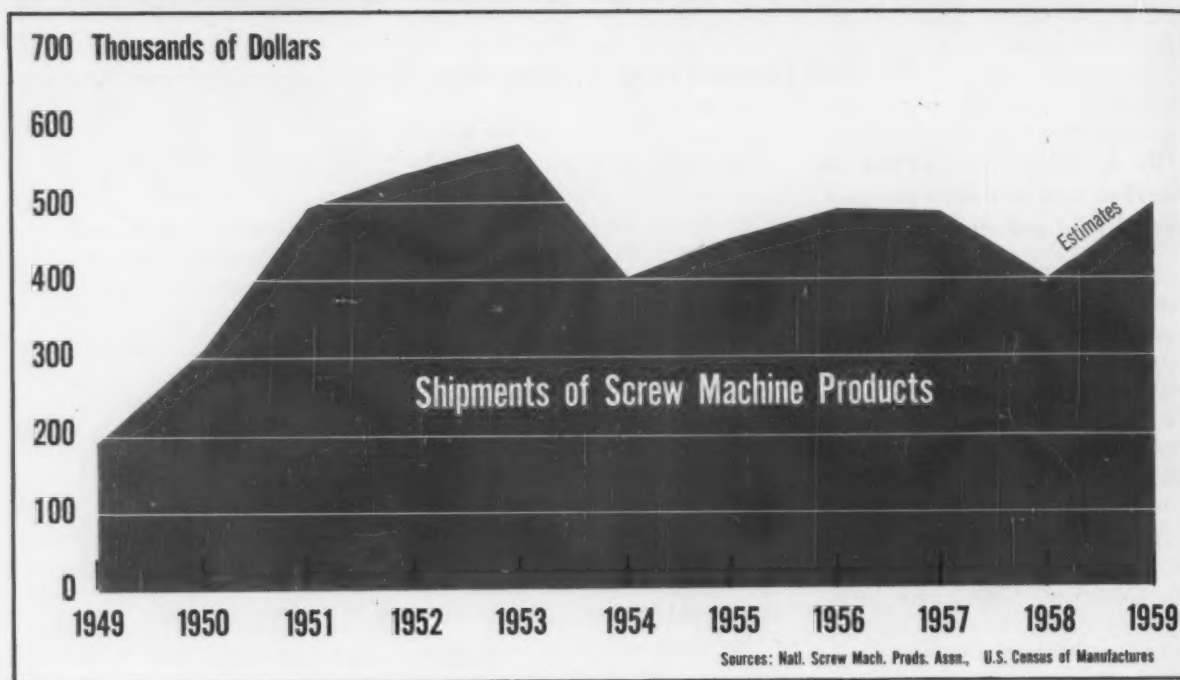
**3. If inventory turnover had been geared to 2½ months by users, steel operations would never have averaged over 88 pct or below 70 pct in the past six years.**

**4. Capacity of the steel industry today is 2 million tons more steel than are consumed each month. It can meet production with an operating rate of 70 pct.**

**5. Little protection is afforded users when inventory buildups force steelmaking operations over 85 pct. Extra steel is offset by disrupted steel supply.**

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## Screw Machine Product Sales Are Moving Up



## Screw Machine Shops Booming

**Independents compare notes at their annual meeting and discover 1959 is shaping up as the best peace time year ever.**

**And it looks like they were able to weather the recession better than the captive shops.**

—By T. M. Rohan.

■ Screw machine parts makers weathered the recession well, have re-taken some captive markets, and are off to a flying start on what looks like their best peacetime year.

But the future is not all rosy.

**They sorely need market planning and modern depreciation costing policies,** says Orrin B. Wertz, executive vice president of the National Screw Machine Products Assn., Cleveland.

Sessions in New York this week were devoted mostly to showing the

members how to run their company better, a session was aimed at telling wives how they're supposed to help their husbands. Attendance was down to 200 from the normal 250, probably because of the rush to catch up with orders after recession belt tightening.

**Recession Rate** — The machine parts makers had a not-too-bad recession decline from \$489 million shipped in 1957 to \$402 million last year. But it was also a pay-off year for them because it showed how well they can compete against captive shops. An association survey of captive screw machine departments showed 30 of 379 had stopped making parts. And many others said they were cutting down on the number of machines.

On the other side of the coin, 300 of about 2200 independent screw machine companies went out

of business last year. Many were one-to-four man shops caught in a market drop. But eight old line companies fell out in the last two years.

**1959 Looks Good** — The part makers got off to a running start this year by operating at a \$500 million rate the first quarter, according to the association. The increase is coming across the board, not from any one industry. Although not the biggest yet, electronics is the most active. Small precision fittings, electrical terminals and similar parts where excess weight is penalized are being turned out by the thousands on screw machines.

Electronics has already become about 10 pct of the total market where the largest segment, automotive, is only 16 pct.

# World Will Use More Zinc

## Galvanizers Expected to Be the Big Customers

**U. S. is likely to continue to be the big producer of both zinc and galvanized sheets.**

**But other countries figure on getting a bigger share of the market.—By K. W. Bennett.**

■ World zinc consumption is again moving up.

The big push is coming from galvanized sheet. Taking a page from the U. S. steel industry, Free World steelmakers are boosting galvanized sheet output at a staggering clip. There are already 30 continuous galvanizing sheet lines outside the U. S. A. Germany is building one. France has six; Great Britain three and building a fourth. There will be at least 14 continuous galvanizing lines in the European Common Market alone.

**In the East**—Around the world, Australia is building a continuous galvanizing line. India is working on three that will consume 20-30,000 tons of zinc each year. Japan, a tough competitor in any export market, is moving strongly into production of galvanized steel.

**Just Ahead**—Leslie Irvine, assistant vice president for sales for Wheeling Steel Corp., told attendees at the joint Lead Industries Assn., American Zinc Institute meeting: "... We find requirements for this product (galvanized sheet) indicated at approximately 4.3 million tons and 4.7 million tons for the years 1962 and 1967." Last year 2,828,848 tons were produced.

"As a matter of fact, galvanized sheets were in short supply some time before the present push for most steel products got underway," Mr. Irvine says. "Certainly in 1958 galvanized sheets were bought to use—not to stockpile.

**U. S. Picture**—Galvanizing already takes 44 pct of U. S. zinc consumption. Combined capacity of the 33 continuous lines in operation in the U. S. and Canada will be insufficient to meet future sheet requirements, Mr. Irvine believes. At least six new lines are being considered by U. S. producers, though none has been started.

**With this excellent world potential for zinc consumption, U. S. zinc producers are talking strong (17 pct) gains in domestic zinc production this year. But they are cau-**

**tious for the long range outlook.**

Here's the market picture.

Australia is a top world zinc market, in terms of per capita use. But Australia is boosting output with new, low-cost facilities. So is the European Common Market.

**Red Menace**—But Russia is working hard to cultivate these areas, and is moving in. Though the USSR supplied only 5000 tons of India's 58,000 ton 1958 zinc needs, the Russians will take Rupees, are driving a hard wedge into this potentially strong market.

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## Zinc Behind the Iron Curtain

R. Lewis Stubbs, director of the Zinc Development Assn., London, England, made a study of the USSR zinc industry when he toured Russian facilities late last year.

**Here is what he told the American Zinc Institute in Chicago last week about zinc in Russia:**

"Thirty years ago output was only 3000 tons a year even though zinc and lead had been mined since 1839. The five year plans changed all this. During the first Plan (1928-32) two new thermal smelters were built at important coal mining centers with the help of foreign experts. One in the Ukraine began in 1930, and the other in Western Siberia in 1931. Also the old plant in the Caucasus was reconstructed and enlarged.

"The second Five Year Plan brought further progress. At the Caucasian plant an electrolytic refinery, designed by American experts, began production in 1934, and another, German designed, started in 1935 in the Urals. By 1938 Soviet output had reached

75,000 tons a year.

"After the war the distillation plants were not rebuilt. Instead, an electrolytic refinery was installed in the patched up buildings of the Ukrainian plant, and in the Caucasus the two old plants were replaced by an electrolytic plant of much larger capacity. At Ust-Kamenogorsk the wartime plant was improved and extended. Then during the fifth Five Year Plan (1951-55) a second refinery was added, based on equipment removed as reparations from the former German plant at Magdeburg, and Ust-Kamenogorsk became the largest Russian centre for zinc. The old German equipment has now been replaced and today produces more than half Russia's zinc metal.

"Since the revolution no zinc statistics have been issued. Estimated at some 130,000 tons in 1950, production is officially reported to have doubled by 1955 and to have risen a further quarter by 1957. In 1958 it was probably between 300 and 350,000 tons."



# Will This Trickle of Trade Become a Flood?

## Waterborne Overseas Trade to Great Lakes Ports—1956

| Product                   | Milwaukee |         | Chicago |         | Detroit |         | Cleveland |         |
|---------------------------|-----------|---------|---------|---------|---------|---------|-----------|---------|
|                           | Imports   | Exports | Imports | Exports | Imports | Exports | Imports   | Exports |
| Finished Steel            | 1,669*    | 28      | 317     | 377     | 9,012   | 2,282   | 952       | 438     |
| Tools and Basic Hardware  | 83        | 18      | 198     | 6       | 3,269   | 31      | ...       | ...     |
| Metal Manufactures, Parts | 80        | ...     | 107     | ...     | 163     | 14      | ...       | 251     |
| Electrical Machinery      | 189       | ...     | 81      | ...     | 454     | 323     | 265       | ...     |
| Agricultural Machinery    | ...       | 319     | 6       | ...     | 986     | 54      | ...       | 102     |
| Motor Vehicles            | 168       | ...     | 337     | ...     | 2,912   | 6,430   | 85        | ...     |

\*All Figures in Short Tons

# Seaway Not an Unmixed Blessing

**Seaway will benefit U. S. industry, will enlarge world market potential for many outfits.**

**But it will also sharpen competition of foreign companies in U. S.—By R. D. Raddant.**

■ "Out here, saying anything against the Seaway is like talking against God and Mother. You just don't do it publicly. But privately, a lot of us are beginning to have misgivings."

This statement is from a Midwestern metalworking executive. It is typical of a lot of thinking in the Great Lakes area as the St. Lawrence Seaway approaches reality.

**Cause for Concern**—The reason: Midwestern manufacturers are about to lose the protection of a 400 to 700 mile rail haul that has tended to keep many lower-cost imports confined to the coastal regions.

A few years ago, when the Seaway was in its planning stage, imports were not a threat. Foreign manufacturers were still recovering from the effects of World War II. In addition, their markets at home took virtually all their production.

**European Comeback**—This is no longer the case. European industrialization has created a productive capacity that is looking for world markets. Labor and other lower cost factors enable them to lay many products down at U. S. ports at well under domestic prices.

And quality and service, while still not up to most U. S. standards, are improving to a point where U. S. consumer confidence in foreign products is gaining rapidly. Prejudice is breaking down.

**A Minority View**—The nagging doubts of the Seaway as an unmixed blessing are still in the minority and will continue to be. The Seaway is primarily a bulk cargo route for ore, coal and grain. General cargo is not expected to be a major factor in total tonnage and still remains a question mark.

Seaway partisans like J. H. Rowland, port commissioner of Cleveland, are optimistic that general cargo will grow to the Lakes after a period of trial. But at the moment, it's still guesswork.

Last year, with 412 shallow draft foreign flag ships tying up at Cleveland, total overseas commerce

totalled 79,121 tons, 40,565 of it imports.

**Some Will Be Hurt**—Mr. Rowland predicts that Cleveland has a potential of 800,000 export tons, with exports exceeding imports by a sizable margin.

"We know that some industries will be hurt," he told *The IRON AGE*. "But at the same time, costs of imported products will be lower."

Mr. Rowland believes that general cargo will have to be developed, but says competition of shipping companies to get into the waterway indicates great interest.

**Unanswered Questions**—Because no one is certain of the Seaway's potential, there is little direct knowledge of how Midwestern manufacturing companies will be hit by increased foreign competition.

One group that already has first hand experience is the wire making segment of the steel industry. With low cost imports already crippling U. S. wire business along the coast, they have no illusions about what will happen when the Seaway opens.

Even before the Seaway, wire products, rods, rebars, and some merchant pipe were coming into the



Midwest steel markets.

Gesturing toward his office window, one executive exclaimed: "I've looked out of that window and seen foreign steel being unloaded. With larger ships, I look for an increase."

**Steelmakers' View**—But steelmakers aren't entirely pessimistic. So far, only products with relatively low quality requirements are coming into the U. S. to any great extent. They don't look for too much competition in high quality products where the mill must work closely with the user.

The foreign producer is not in a position to provide the service that a U. S. steelmaker can, nor can he provide a continuous flow.

**Delivery Problem** — Although some foreign steel is promised for delivery in a relatively short time, the time element is a problem that can not be solved easily. Furthermore, the Seaway will be an eight-months proposition, with the St. Lawrence closed to navigation at least four months.

But if foreign steelmakers intend to invade the Midwest on a permanent, continuing basis, it is expected that they will install their own warehouses or depots to provide year-round service. However, cost of warehousing foreign steel would tend to cut the price differential.

American steelmakers also point to instability in price of foreign steel. They contend that the margin narrows as the market here tightens.

**Foreign Steel Prices** — "Firms who buy overseas will find their price advantage evaporates in a tight market," one points out. "Foreign plate, for example, sold last year in the Chicago area for about \$30 a ton under the U. S. price and is now going for \$10 per ton over."

"Also, many firms have found that they will place an order at a low price. When the market tightens, the price goes up. Then newer orders at higher prices get shipped and the older ones don't."

But for the foreseeable future, foreign producers will not try to

compete in a full line of any product, even nails, for example. Generally, the steel industry as a whole will not be hurt significantly. Smaller producers specializing in products that are in competition with imports, will be.

**Machine Tools Worry**—In other industries, the picture is less clear. Machine tool people, who are already suffering from lower-priced, general-purpose tools from abroad, believe the Seaway will accelerate the trend by providing an even greater price advantage for imports.

One executive of a Midwest fastener company calls steel companies "neophytes when it comes to imports." His own industry has seen imports reach the point where they equal 45 pct of domestic shipments. What once was a substantial export market has been virtually wiped out.

**Fasteners Hurt**—In his own industry's case, he sees the Seaway as providing just another assist to the import market.

Foreign producers are underselling U. S. fastener makers by 25 to 30 pct, he says, and could widen the margin if they had to. And they are promising 30-day delivery.

**Auto Affected**—Another industry that faces added competition with the advent of the Seaway is the auto industry. The water route

## Seaway Opens

With the first ships moving through the locks late last week, the St. Lawrence Seaway is now a reality.

Overall, it will prove a major asset to Midwest industry. But becoming a new seacoast has its problems, as indicated in this story.

to the Midwest could shave the price of the imported cars that are already giving the automakers headaches.

At one time, with automakers exporting more cars than were imported, the Seaway would have been a valuable assist. Now, it will provide easy access for imports, now flirting with a 400,000 annual rate and headed higher.

**Buses, Trucks Benefit** — However, trucks and buses still are in demand abroad, and the Seaway can facilitate export from Midwest plants.

This is the negative side of the Seaway. Manufacturers of construction equipment, agricultural machinery, mining machinery, to name a few, will find the Seaway a help in reaching their foreign markets.

## Inland's Smith Cites Threat

Commenting on the Seaway's significance at the annual stockholders' meeting last week, John F. Smith, Jr., Inland Steel Co. president, made these points:

One of the immediate effects may be an influx of foreign steel into the Chicago area which until now has not experienced it to the extent that coastal port areas have.

Steel products entering Chicago on vessels through the Great Lakes during 1958 amounted to only 48,500 tons. However, that was almost five times greater than in 1957.

Total steel imports of 1,700,000 tons in 1958 are translated into 27,000,000 man-hours of work and almost \$97,000,000 in wages and other employee benefits.

**A Peoria housebuilder can buy a keg of Belgian nails for a dollar less than he would pay a local mill. An Illinois farmer can purchase a ton of imported barbed wire at a price \$40 below the American product.**

Imports of reinforcing bars rose 195 pct from 1957 and equalled 23 pct of shipments by U. S. companies.

# Tin at Stake in Bolivian Crisis

## Outlook Is for Lower Level of Exports

**Economic chaos and political upheavals have taken a toll on Bolivia's tin industry.**

**Present government hopes to stabilize tin, develop other exports.—By F. J. Starin.**

■ Bolivia and tin have been inseparable.

The country supplies about 20 pct of world needs. And tin brings in about 70 pct of Bolivia's income.

It is unlikely this union will ever be torn asunder. But tin may find

itself sharing the spotlight with other export products.

**Economic Chaos**—The outlook: Much less tin from Bolivia as soon as the government can shove its stabilization program down enough of the right throats.

Bolivia is racked by such devastating economic chaos, it has averaged a revolution a year since the big one in 1952. Right at the heart of the trouble—tin operations are sinking deeper and deeper into the red.

Can Bolivia pull out? Here's what some people who should know say:

**New Leadership?**—An American engineer familiar with Bolivian tin mining says, "I have many friends in Bolivia, and I would like to see their country back on its feet. But I am afraid it will take new leadership."

A major step, according to this engineer, would be a really sound mining investment code "establishing the equity between the four partners—labor, management, capital and government."

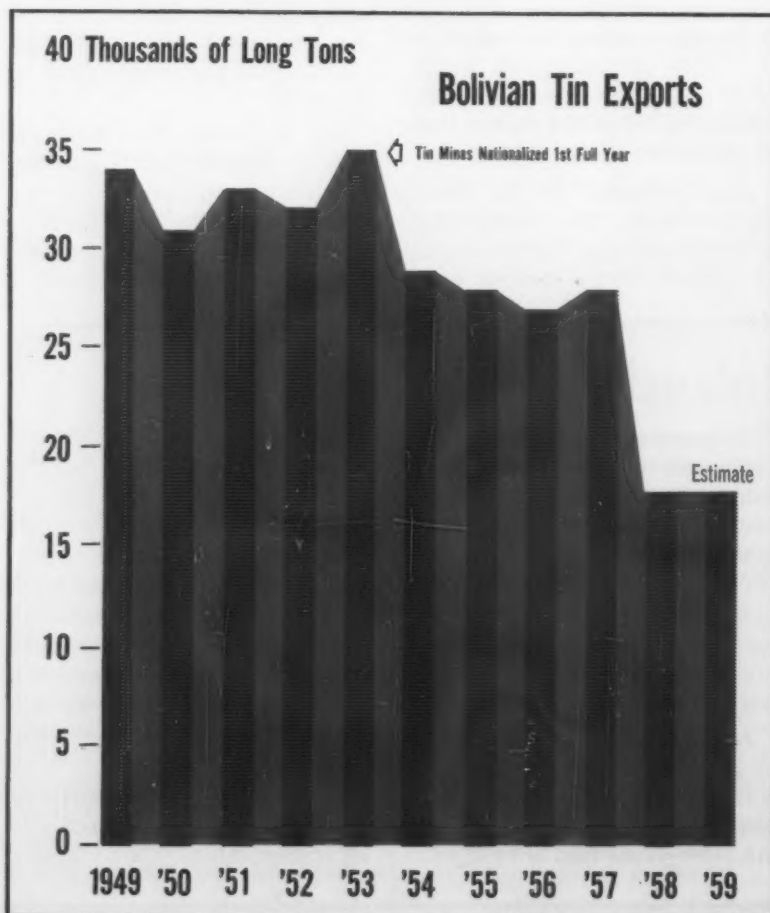
**Diplomats Speak**—A Bolivian statesman in this country says militant labor unions representing mine workers, particularly in tin mines, are a major stumbling block. To stem inflation would require some belt-tightening measures to which unions are opposed, he says. But this diplomat believes his government has made progress.

A U. S. State Dept. spokesman says a major long term problem is making the investment climate more inviting. The U. S. is cooperating by guaranteeing the investment of any U. S. citizen in Bolivia against expropriation and lack of convertibility. Already a number of major oil companies have taken advantage of this, and this industry looms as the big tin challenger.

**Outside Aid Certain**—The U. S. State Dept. observer believes Bolivian attempts at stabilization are "moving well." Of course Bolivia can count on U. S. aid along the way because, "If we don't help them there would be political, economic, and social chaos; or someone else would help them. Neither one is good for us."

The International Monetary Fund has extended a \$7.5 million line of credit to Bolivia. So they keep an

## Less Tin From Bolivia



eye on things. A report on Bolivia has recently been completed. It is confidential, and not even approved yet by the IMF board of governors. But, insiders say it concludes Bolivia rode out a severe economic crisis in mid-1958, and is now managing her affairs with some success.

**Behind the Scenes**—Here is the backdrop that shows up the problems the government faces.

Post World War II saw 95 pct of all Bolivian foreign exchange income, and 50 pct of her gross national product controlled by three companies. In 1952 a popular revolution put industry, particularly the profitable tin mines, in to the hands of the people.

Trouble began immediately. About 70 pct of the management, technical staffs and working capital left the tin industry.

A Bolivian frankly estimates that tin mines today are saddled with 5000 to 6000 more workers than they can economically use. Also, some mines are being worked at ridiculously high costs so as not to displace the workers.

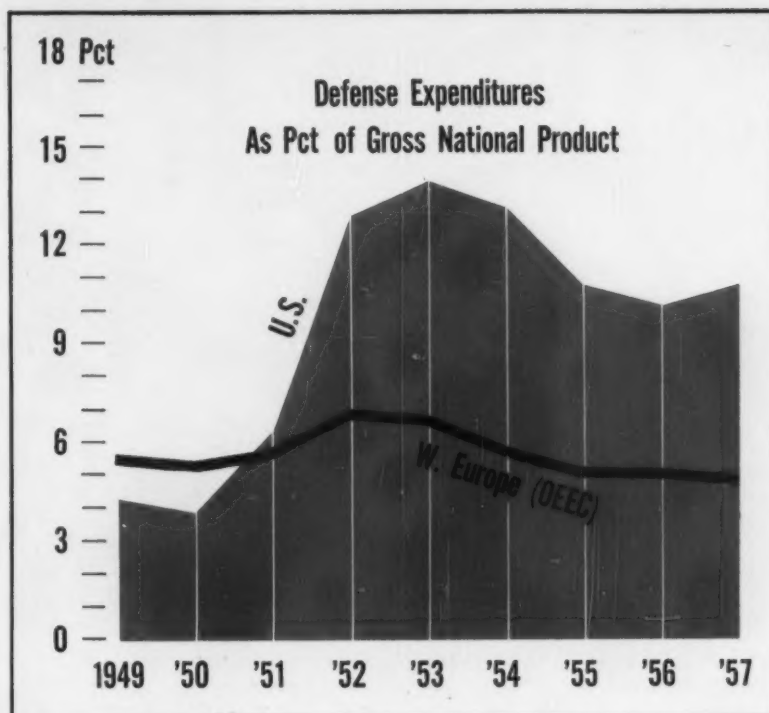
**Affects Neighbors**—Salaries went wild, at one point jumped 350 pct in seven months. And the government subsidized commissaries from which the workers could buy at less than cost.

Workers bought all they could and bootlegged the surplus. This just about destroyed private industry. And it had even further repercussions. Bolivia's neighbors passed high tariffs to prevent these bootlegged goods from affecting their shaky economies.

**The Coming Election**—There'll be little concrete action until mid-1960. Reason: There are national elections in May 1960.

After the elections the government is likely to try to finish the program it has already started; that of closing the commissaries, unfreezing prices, closing up uneconomical tin mines and putting surplus workers to work on the fertile farmland not now being used, or in other budding industries.

## Defense Cost: U.S. vs Europe



## Foreign Aid Spending

■ American spending in Europe and elsewhere to create a "military shield" is costly and an unnecessary drain on the U. S. taxpayer.

It encourages other governments to postpone their own economic housecleaning. And it deprives the U. S. of capital needed for its own industrial vitality.

**How Fair?**—These assertions were made before a House Foreign Affairs Committee by Walter Harnischfeger, president of the Harnischfeger Co. Testifying against extending the foreign aid program, he pointed out national income and production are rising in Europe and asked "what about the amounts being devoted by these allies to the common defense effort?"

Within Western European nations in the OEEC—Organization for European Economic Co-opera-

tion—the gross national product rose by 63 pct between 1948 and 1958. Yet in the U. S. it only went up 35 pct in the last ten years.

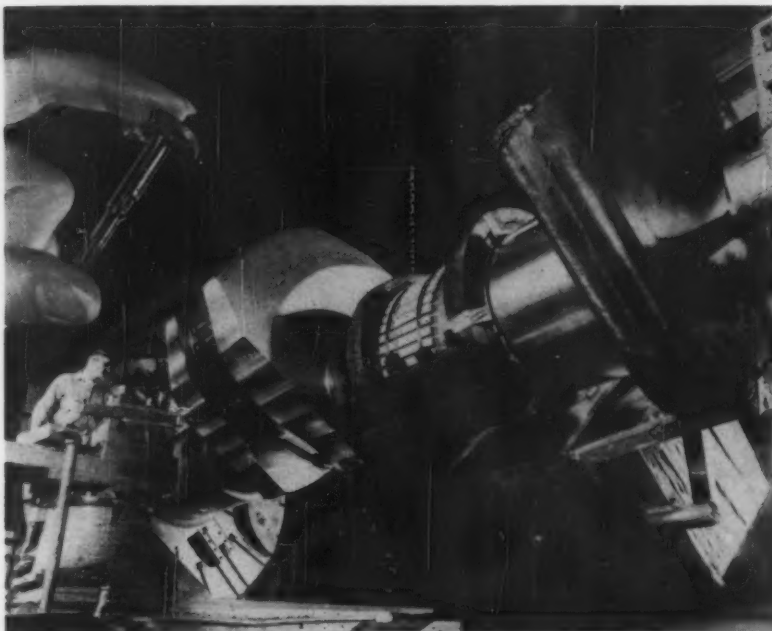
**More From Less**—Despite this, American defense spending in relation to GNP was 4.4 pct in 1949 and is above 11 pct today. In contrast defense spending by the OEEC nations consumed 5.3 pct of the gross national product in 1949, dropping to 4.8 pct in 1957. (See chart.)

"Effect of this," says Mr. Harnischfeger, "is an increasingly heavy tax burden on the U. S. taxpayer, which tends to draw capital from useful effort."

"Mutual defense must come," he adds, "from common policies, common interests, common ideas, and a common culture, not in a system of payments, whatever the guise."



## Story of Two Crankshafts



**BIG AND LITTLE:** One crankshaft shown above will weigh 60,850 lb when completed; the other weighs .44 oz. The former will be used in an 1800-ton pipe extrusion press being built by Mannesmann-Meer, Inc., Youngstown. Total of 120,000 lb of counterweights were used to balance it while it was turned on the lathe at U. S. Steel's Homestead District Works. The other one is for a model airplane engine.

## Metal Powder Headed For Record Year

Metal powder industries appear headed for a record in 1959. That's the word from Dr. George A. Roberts, vice president of technology for Vanadium-Alloys Steel Co., and president of the Metal Powder Industries Federation.

**The Outlook**—Dr. Roberts said ferrous powder production, will be about 20 pct higher than the record of 32,000 tons in 1957. Last year output fell to 30,000 tons.

Production of nonferrous metal powders, while not up as much as ferrous powders, is showing a healthy 10 to 15 pct increase over last year's rate of 18,000 tons.

**Good Supply**—Despite growing markets the federation president said there is no possibility of a shortage of metal powders in the

foreseeable future. "If business should double overnight, it wouldn't strain capacity," he said.

**Powder metal production capacity has consistently over-anticipated its markets, with both use and production capabilities increasing at about the same ratio.**

A number of developments have contributed to the continued growth of the powdered metal industries. In manufacturing, improvements have been made in quality of materials, and in equipment for production. Parts producers are able to quote on parts considered "definitely uneconomical" only a few years back.

The industry can now produce larger parts—weighing to several pounds each.

**Markets**—A Chrysler Corp. engineer, telling of advancements in automotive applications, forecast "an increase of 100 pct in the use

of powder metal parts in automobiles in the next 3 to 5 years—at least 200 pct increase in the next 10 years."

New applications are being found in the electronics field where ferrite and iron powders are being used in computer components and similar special applications.

Looking ahead, Dr. Roberts says the greatest potential for the powdered metals industry will likely be found in direct production of mill products from powder by rolling or extrusion (IRON AGE, Apr. 23, P. 112).

## Probe Aircraft Salaries

Salaries of executives in the aircraft and missile production business will claim the attention of Congress before long.

A House investigation confined primarily to research and development in air weapons will be expanded to include a look at some of the salaries the contractors pay. The aim will be to find how much of a cost-plus-fixed-fee contract goes for actual work and how much to keep the executives happy.

Rep. Hebert (D., La.) heads the House Armed Services subcommittee that is conducting the current investigation.

## ICC Backs Shippers

Shippers are entitled to normal truck and rail pickup and delivery despite peaceful picketing of struck plants.

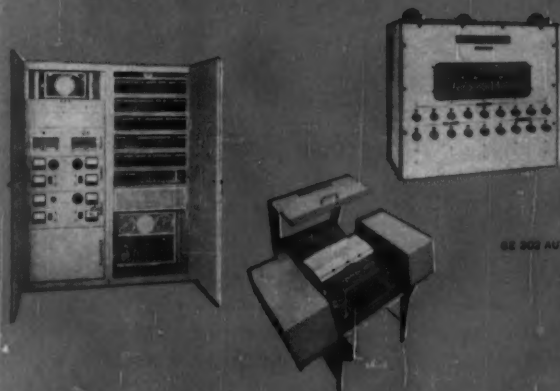
A new Interstate Commerce Commission order affirms this right. The agency orders public carriers to cancel, by May 27, tariff schedules which would allow the transporters to withhold service for reasons of "picketing or other labor disturbance."

This question of a denial of service on the grounds that operations would be impracticable was acted on by an ICC division in 1958. The three-man division held that the impracticable operations rules were neither just nor reasonable. Now the ICC as a whole finds the division's decision sound.



## COMPUTER PROGRESS FROM GENERAL ELECTRIC

### CUSTOM DESIGNING MODULAR COMPUTER COMPONENTS TO SOLVE A TINPLATE INSPECTION AND BILLING PROBLEM



GE 302 AUTOMATIC INSPECTION DATA ACCUMULATOR

The trend toward purchase of tinplate direct in large coils rather than sheets placed an unusually difficult inspection and billing problem upon manufacturers.

The G-E 302 Automatic Inspection Data Accumulator—custom-designed by the Computer Department—solves this problem by electronically accumulating and tallying data from inspection sensors in a new solid-state system. The system is fully automatic ... provides a complete type-written record for quality control and billing purposes immediately upon completion of each coil.

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CPB-14 (6-59)



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\* Tonnage output will vary depending upon width and gauge of strip being processed.



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Norman S. Mott

# Landmark in Stainless Research

It takes a lot of dedication on the part of a researcher to develop a new product.

Here is an episode in the development of stainless steel alloys.

■ Norman S. Mott's work with stainless steel alloys is a shining example of how research can stimulate company growth and morale.

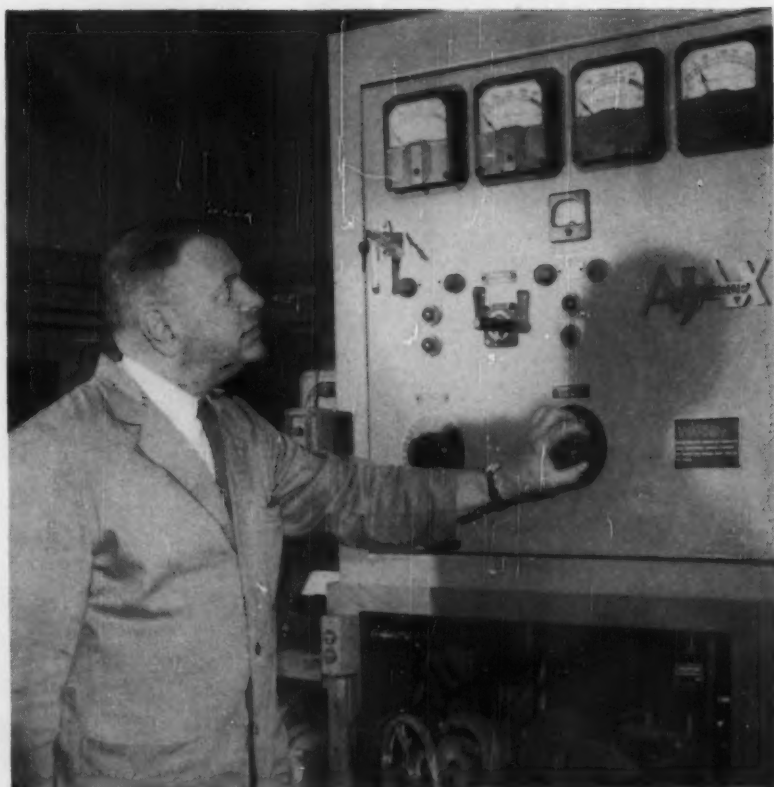
Mr. Mott is chief research metallurgist at Cooper Alloy Corp., Hillside, N. J. He is inventor of the PH55 series of stainless alloys—a group of four new metals that have the combined properties of high strength, hardness, and corrosion resistance. Getting these three properties into one alloy has been an objective of the stainless industry for years.

**An Old Hand**—Now the breakthrough appears accomplished. The use of Mr. Mott's PH55 alloys in forgings, castings, and wrought products has strong potential. The people at Cooper Alloy feel they are on the threshold of a new era.

For Mr. Mott, however, this feeling of accomplishment is not a new one. For 25 years he has been hacking away at the strength and corrosion problems involved in making stainless steels. During this time he developed and patented alloys V2B (1953) and PH20 (1956), and a process for "Bright Pickling of Stainless Steel Corrosion Resistant Ferrous Alloys" (1944).

He has written 50 technical articles which have appeared in 11 trade journals.

**Tough Getting Started** — Mr. Mott "got his metallurgical education the hard way—by working with



**NORMAN S. MOTT:** Research is an expression of teamwork.

metals on the job in the foundry."

Born 54 years ago in Nyack, N. Y., he was graduated from Stevens Preparatory School in 1924. He studied at Rensselaer Polytechnic Institute for one year, then continued his education by taking night courses at Brooklyn Polytechnic Institute from 1925-32, majoring in chemical engineering. During days, he worked at Babcock and Wilcox as a chemist and metallurgist. In 1932, he joined Cooper Alloy as chief chemist.

**A Pinch-Hitter**—Extremely well-oriented saleswise, Mr. Mott can and does engage in technical sales activity. His 34-year background in

metallurgy and foundry practice permits him to double-in-brass in many jobs.

In metallurgical matters from top management down, "What's Mott's reaction," is pretty much a standard at Cooper Alloy. Like many another dedicated researcher, he can't find enough time in a day to do all he wants. He works about 55 hours a week.

In his unassuming manner, Norman S. Mott has done his share in contributing to the advancement of metallurgy. But he's far from finished. Coming up: Two as yet undesignated superior corrosion resistant alloys.

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yet highly flexible and easy to handle. The chemical rust inhibitor is compatible with oil and stays effective for long periods even when the humidity soars.

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How to rustproof a freight car—Ferro-Pak is used to line sides of car and to interleave coils, transforming ordinary freight car into huge rustproof package.



How to rustproof black plate—On this light gauge, dry, uncoated steel, rust can start from a fingerprint. Ferro-Pak keeps black plate rust-free even when the humidity soars!

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# How Boom Started Back in '58

**Early signs of returning confidence meant improvement in consumer buying attitudes.**

**But most of the forecasters underestimated the extent of the recovery. And the trend is still on the upgrade.**

■ As the business pickup started to show some life last year, alert businessmen turned much of their market research toward gaging buyer attitudes.

Their intent was to probe for signs of confidence that would lead to more spending for major durable items—cars, refrigerators, TV sets and the like. There was no hope for a new capital spending boom. Any real recovery, then, would depend on a big uptrend in large consumer goods.

**The First Signs**—Late last year, one respected index of consumer attitudes (The Survey of Consumer Attitudes and Inclinations to Buy, by the University of Michigan Survey Research Center) reported gains in confidence after a low ebb earlier in the year.

Based on that survey, The IRON AGE stated with caution: "The boost in confidence, if backed up by a continuing favorable rate of income, should result in improved purchases." (The IRON AGE, Dec. 11, 1958)

**Proved True**—It's obvious now that consumer income did not fall off, but started to rise. Now, the cautious prediction of December has proven true with a vengeance.

The Office of Business Economics, in its current review of the business picture, reports:

"With the uptrend in personal income, consumer buying advanced

and most major groups shared in the expansion. Sales of durable goods have risen in recent months to exceed the previous dollar high. In nondurable lines, sales in the first three months were maintained at the high volume reached in late 1958."

**GNP on the Rise**—The better-than-hoped-for upsurge this year brought the annual rate of Gross National Product to \$465 billion for the first quarter. You may recall that in making up the budget, the Administration estimated a GNP of \$470 billion this year.

## Can Prices Hold Stability?

■ Principal significance of the GNP rise is that all the gain is in physical volume of output.

Price fluctuations have tended to destroy GNP as a valid indicator. However, prices showed little change in the period. This means that the GNP climb is based on consumer demand, an increase in business fixed investment, and inventory rebuilding.

**Nine Months Stability**—In fact, prices continue to show amazing stability. In March, the Consumer Price Index held at 123.7. It was the ninth month in which the index held within 0.2 pct. This is the longest period of stability on record.

However, price analysts are not too confident of, holding the line in the future. Some seasonal gains are expected in the next two months. And after that, no one will predict price trends.

**Up to Steel Contract**—Even the most brash economist isn't going

At the time, that estimate was believed to be, way on the high side. But now it appears within reach. Second half doubts still remain, but GNP for the first half should reach or surpass the Administration's goal, which is better than most would have guessed.

What it also means is that the Administration's goal of a balanced budget is not as unattainable as originally thought. It is now up to Congress to keep spending in line, which is doubtful. But the revenue estimates should be reached.

to predict the outcome of the steel negotiations, which will have such an important factor in future price trends. If steel prices have to go up, it could be like a dam bursting.

Anything can happen unless the steel companies and Steelworkers reach a settlement that won't mean price increases.

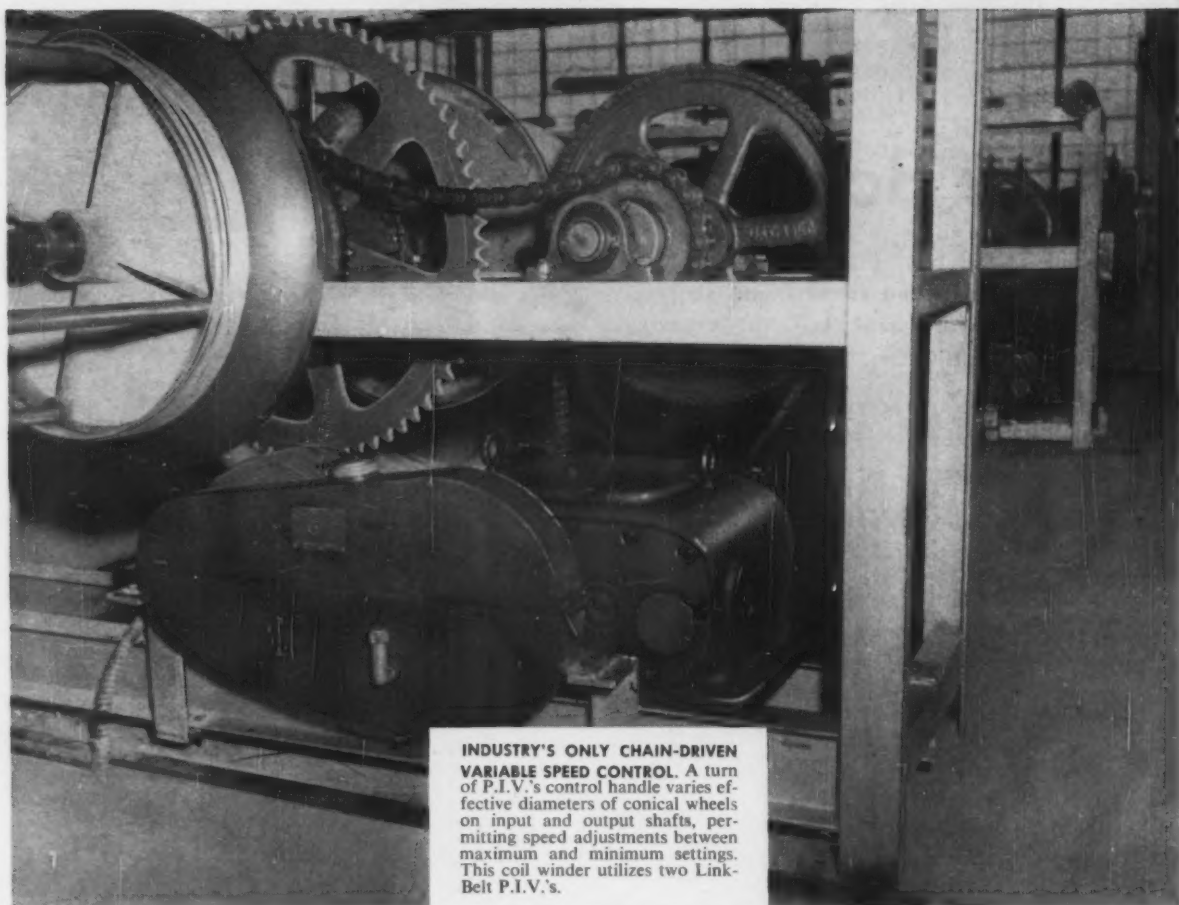
## Freight Cars Zoom

When the railroads start ordering freight cars in big numbers, you know that a boom is not coming—it's arrived.

In March, the nation's railroads ordered 10,795 cars. This compares with 2,486 cars ordered in February and a piddling 193 a year ago.

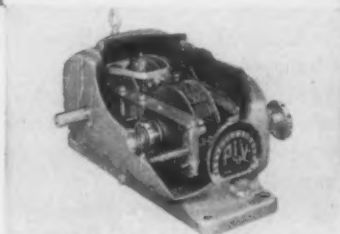
The March orders are by far the greatest in over two years. In that interval, the roads' retrenching policy kept new orders at a trickle.

As a result of the March splurge, backlogs of freight cars stand at a respectable 35,487.



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# Radio Bids for Highway Control

## Delco System Would Transmit Messages to Passing Cars

**Highway officials are being sounded out on a new, low frequency radio system for traffic control.**

**Idea was developed by Delco Radio Div., General Motors.—By H. R. Neal.**

■ In the past year, engineers at General Motors Research Laboratories have unveiled developments which have replaced the accelerator, brake pedal, steering wheel, the need for manual steering—in fact, practically everything but the driver and back-seat driver.

Often, however, the driver is the only occupant in a car. Last week engineers from the research labs and Delco Radio Div. demonstrated their latest development—a sort of electronic mother-in-law.

**Warnings by Radio**—The system is an experimental low frequency radio system which transmits brief messages to passing vehicles. The messages can be any type—information on road conditions, changes in the speed limit, location of the next exit on an expressway or turnpike, or a warning of road dangers ahead.

The highway information system, named Hy-com (highway communications) has two basic parts. There are low frequency transmitters spaced along the highway, and transistorized receivers in cars. The receivers can either be separate units, designed to operate alone or through the present automobile radios, or in the future could be combined with a standard car radio.

**Exploits Transistors**—Hy-com is designed to operate whether or not

the car radio is turned on. If the radio is turned on, it is automatically muted during transmission of the message. If the radio is off, it is possible for the transmitter signal to trigger the output stage of a transistorized radio and put the message through the loudspeaker. (Transistorized radios don't require a tube warm-up period, and transmit sound almost instantly)

Transmitters can be either portable or permanent installations. Permanent installations would

utilize loop-antennas imbedded in the ground and strung out along the side of the road for any distance required to transmit messages of 3 to 6 seconds duration (about 300 ft for cars traveling about 60 mph) and would be long enough to ensure each driver's receiving an entire message.

**Alternative Setup**—A small tape recorder is used to send repetitive messages. However, the same transmitter units can be used to relay

## No, It's Not a Car Washing Concession



**WATER-TIGHT TEST:** At Dodge Div. test station, each car is deluged at the rate of 3.11 in. of water a minute—nearly five times greater than the heaviest recorded rainfall in U. S. history. Water is under 30 lb pressure. Inspector (top) uses flashlight to check for leaks.



messages from highway patrol cars or helicopters.

Another version of the transmitting setup employs ferrite antennas located above ground along the roadside and can be either a permanent or portable installation. The message is transmitted in about a 60 ft radius from the above ground antennas. Therefore, the distance over which the motorist hears the message can be varied by the number of antennas placed along the side of the road. For the average message this would mean 4 to 6 antennas.

**One-Way Broadcasting**—Because of the precisely-controlled range possible with low frequency (9 to 15 kc), a message meant for motorists traveling in one direction on a road would not be heard by motorists driving in the opposite direction.

On trunk roads without a medial strip, a signal received just ahead of the message section could trigger receivers. Cars moving in the opposite direction would be past the message area before their receivers

were triggered and be out of range immediately.

**Messages Get Through** — The system is so designed that broadcasts in other areas wouldn't interfere with normal radio reception. Broadcast zones can be arranged so they don't overlap. Large objects, such as trucks, passing between receiving sets and the transmitter don't block out the signal, consequently motorists are less apt to miss warning or direction signs which might be blocked from view.

GM is now demonstrating the system to highway, turnpike, safety and traffic officials, suggesting a number of possibilities:

1. The system could give motorists almost instantaneous trouble-ahead warnings and assist highway officials in expediting and re-routing traffic flow.

2. Transmitters could supplement roadside traffic signs, particularly when they are obscured by darkness, fog, snow, or mud. In any event, the engineers say, they could notify motorists of approaching thruway exit ramps in time to

## Automotive Production

| WEEK ENDING   | CARS      | TRUCKS  |
|---------------|-----------|---------|
| Apr. 25, 1959 | 133,918   | 26,260  |
| Apr. 18, 1959 | 135,934   | 26,440  |
| Apr. 26, 1958 | 58,664    | 16,204  |
| Apr. 19, 1958 | 73,219    | 16,656  |
| TO DATE 1959  | 2,086,293 | 401,644 |
| TO DATE 1958  | 1,507,467 | 290,334 |

\*Preliminary

Source: Ward's Reports

manuever their cars safely into turnoff lanes.

3. The system could be integrated with police and highway department radio communications, as well as with helicopter traffic patrols.

4. Portable transmitters could be used which a patrol officer could set up near an accident scene with a repeater tape message to warn oncoming traffic.

**Speaking of Price**—GM Research Laboratories and Delco Radio engineers believe the vocal signal is the most important system feature. Their tests show a brief vocal explanation or tip-off is likely to be far more informative than any array of warning lights, buzzers or other such devices.

Until they hear what additional requirements the highway officials might want incorporated into the system, company officials are avoiding putting a price on the system. However, a Delco official said car radios incorporating the Hy-car receiver would probably cost only about 25 pct more than present auto radios. Transmitting units would cost in the range of \$1000 each.

## Earnings Are Up At Ford

At the end of the first quarter, Ford was roaring up the highway of record earnings. It passed the quarter post at the highest rate ever for the distance with earnings of \$134.8 million, 22 pct above the previous first quarter high of 1955, and not far off the record \$136.7 million posted in the second quarter of 1955.

## The Bull of the Woods





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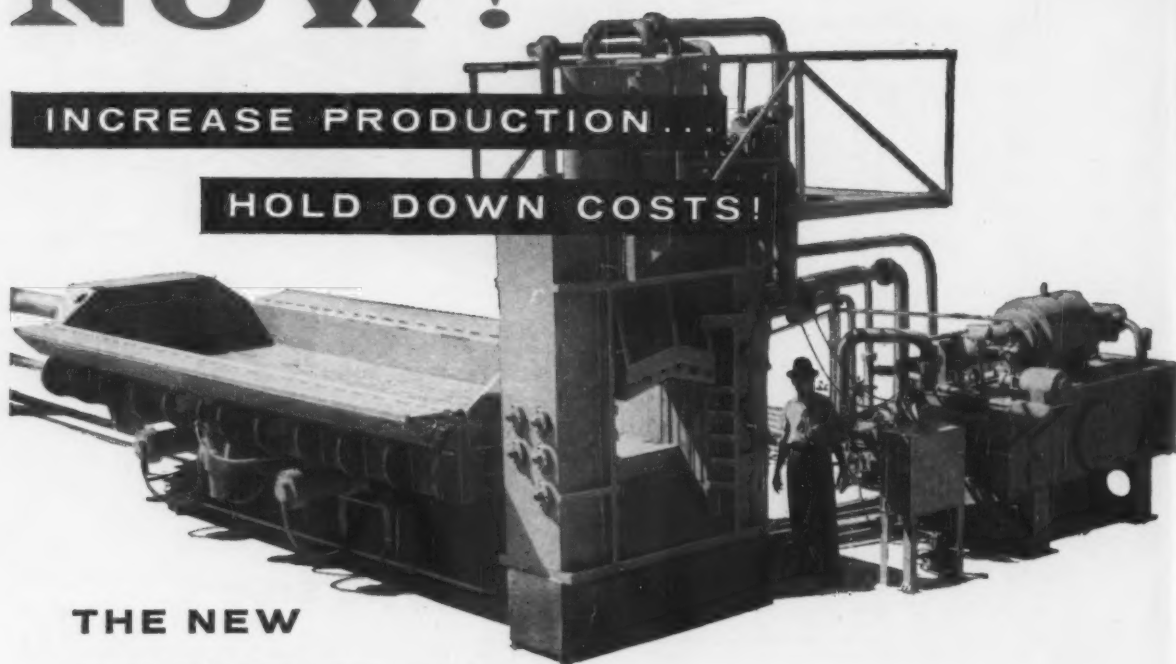
• Armco Steel Corp. • The Babcock & Wilcox Co., Tubular Products Div.  
• The Carpenter Steel Co., Alloy Tube Div. • Clayton Mark & Co. • Damascus  
Tube Co. • Jones & Laughlin Steel Corp., Electricweld Tube Div. • National  
Tube Div., United States Steel Corp. • Ohio Seamless Tube Div. of Copper-  
weld Steel Co. • Republic Steel Corp., Steel and Tubes Div. • Revere Copper  
and Brass Inc., Rome Manufacturing Company Div. • Sawhill Tubular  
Products, Inc. • Southeastern Metals Co. • The Standard Tube Co. • Standard  
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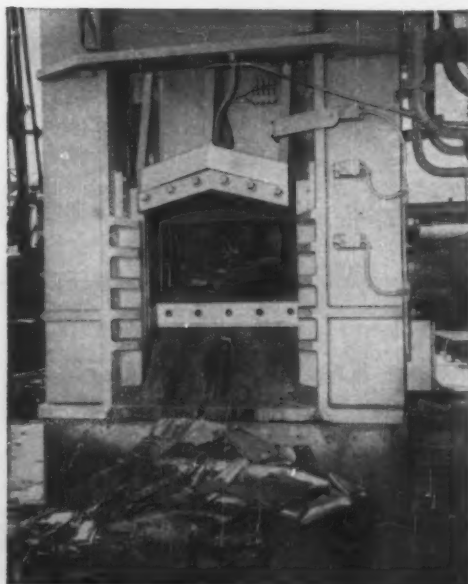
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## **HARRIS BS-350 BALER- SHEAR**

**AUTO FRAMES** and bulky scrap work through easily. The Harris Baler-Shear was designed to eliminate problems arising from the preparation of bulky scrap. It incorporates the principles of baling and shearing.



### SPECIFICATIONS

|                           |                |
|---------------------------|----------------|
| size of charging box..... | 264 x 83 x 41" |
| shear opening height..... | 20"            |
| shear opening width.....  | 36"            |
| shear force.....          | 350 tons       |
| floor space required..... | 55' x 20'      |

**HARRIS FOUNDRY  
& MACHINE CO.**

Hydraulic Engineers Since 1889

CORDELE, GEORGIA

► *Talk with a Man from Harris*

# What to Do With Excess Money

That's the Problem Defense Chief McElroy May Face

**It now appears Congress will vote more ICBM money than the Defense Dept. has asked.**

**Possible answer: Pentagon may hold back the extra money.**  
—By G. H. Baker.

■ Defense Secretary McElroy is pondering what to do if Congress votes more for intercontinental missiles than he asked.

The Air Force, responsible for ICBM programs, has requested \$2.6 billion for missiles in the year beginning July 1. This is not broken down to show the amount intended for long-range missiles. But it is evident now that a strong effort will be made in Congress to tack on more ICBM money.

Rep. Mahon (D., Tex.), indicates he is dissatisfied with the amount asked for ICBM. As chairman of a defense appropriations subcommittee he is in position to drum up support for more money.

Secretary McElroy is well aware the military may be given more money than they called for. In 1958, Congress voted additional funds for such weapons as the Polaris IRBM and the Minuteman ICBM. Some of the 1958 money is still held up by the Pentagon, for possible use in the coming year.

**Won't Push Atlas**—Mr. McElroy has said his office has no plans for accelerating the Atlas ICBM program further. This missile, thoroughly and successfully tested, is seen in some quarters as ready for much heavier financial backing to speed its production.

The Defense chief admitted, however, that his office is studying possible accelerations of many pro-

grams just-in-case. He conceded his officials must keep up a constant review of these programs, in case new intelligence estimates or a failure dictates a change in emphasis.

**Tight Purse Grip**—Mr. McElroy believes that if Congress votes a defense budget of more than the requested \$40.9 billion, President Eisenhower probably will go along with it. But the Defense Dept., with White House approval, may hold back unasked-funds, on the grounds they are not now needed.

Recently, the Defense Dept. called attention to its action on the

extra money approved last year for the solid-propellant Minuteman. An extra \$90 million was voted.

## 'Normal' Unemployment

It looks like we'll just have to get used to the idea of a larger U. S. unemployed total.

Although politicians aren't happy about it, most economic experts in Washington now say 5 pct of the work force unemployed is going to be "normal" for the next several years.

Up to now, 4 pct unemployed has been considered "normal."

## Fewer, Bigger Missile Makers?

**Wheat From the Chaff**—A leading government executive on missiles predicts flatly the Pentagon will be doing business with fewer but better missile contractors before long.

Brig. Gen. Austin W. Betts, executive assistant for missiles to Defense Secretary McElroy, likens the existing pattern in missile making to automotive manufacturing 40 years ago.

**Survival of the Fittest**—"The reason there are only six or seven major automobile producers in the country today is that in this highly competitive business only that many were able to survive," Gen. Betts points out. "They found that by integrating development and production capabilities, they were able to compete more effectively."

"I think we must look forward to the same ultimate future in the busi-

ness of the guided missile program. With fewer systems, we will need fewer development teams. With more complexity, each team will have to be technically more versatile."

"At the same time, we will need strong support of a broad research and component development program to assure continuing advances in technology across the board."

**Must Be Farsighted**—"We must learn to support this type of effort (research) even when specific applications are not immediately apparent. Only in that manner will we be able to take long steps forward when we decide to produce a new missile or other weapon system."

The weeding-out process among missile contractors will not be due entirely to the coming efficiency contest. It will result also from Pentagon decisions to drop marginal and obsolete weapons.



# MEET MRS. PETER PEFF

...and her company's new lightweight  
liquid-oxygen "vacuum bottle" for jet planes



Mrs. Peff, president, Superior Air Products, Newark, N. J., with Supairco's recently developed liquid-oxygen "vacuum bottle."

**M**ANY a tough problem has been solved by Mrs. Peff and her company since 1952, when she assumed the presidency after her husband's death. Specialists in building low-temperature apparatus and complete plants to produce oxygen and other gases, "Supairco" was asked recently to develop a light, compact container to supply oxygen for aircraft crews at high altitudes.

Ingenious design utilizing the broad and varied properties available in copper and its alloys produced the "vacuum bottle" shown above. The inner sphere is of Everdur®, Anaconda copper-silicon alloy, which has the workability and resistance to corrosion needed—and, more important, the strength and toughness to make possible a relatively thin, light shell that can withstand vibration and fatigue stresses aloft—plus shocks from catapult launchings and carrier landings. The outer shell is of Anaconda copper, highly polished to reflect heat. This, plus a vacuum under .001 microns between the spheres, holds liquid oxygen at -297 F.

Starting with over 100 standard copper alloys, Anaconda can provide an almost unlimited number of combinations of useful properties. When new and unusual problems arise, use Anaconda technical specialists to help you select metals for your needs. Address the American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont. 1041



**LEFT:** Inside the copper shell in main illustration is this slightly smaller liquid-oxygen container made of Everdur, the metal that spins and machines readily, is easy to join by soldering, brazing, welding. **RIGHT:** Completed liquid-oxygen converter, built by Mine Safety Appliances Company, Pittsburgh, Pa., serves 8-man crew. It is one-third the weight of the cylinder it replaces, takes much less space.

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NICKEL SILVER MILL PRODUCTS**  
*Made by The American Brass Company*



# Why Missile Costs Are Going Up

## Support Equipment Is Growing Expense

**Missile spending includes far more than the cost of the weapons themselves.**

**For every dollar that goes aloft, two dollars are spent on equipment to arm, fuel, test, transport, launch and track them.—By R. R. Kay.**

■ Space Age weapons, vehicles, and support equipment are going to cost astronomical amounts.

And some weapons systems could well reach \$10 billion before they become operational.

**More Than Weapons** — The growth in missile spending does not stop with the weapons themselves. For every dollar spent on them, two dollars go for what it takes to transport, arm, fuel, test, launch, and track them.

Farwestern missilemakers are

pretty much agreed that future weapons systems will be smaller, more reliable, and flexible devices. But their cost will keep going up and up.

**Slice for All**—From Mexico to the Canadian border, the impact on the economy of the missile dollar is terrific. Almost every segment of West Coast business is getting a slice—directly or indirectly.

Small manufacturing firms are being cut in. Old line planemakers, of course, are deep in weapons systems work. In some companies, missiles sales are ahead of military aircraft sales.

With all the emphasis on ballistic missiles, take it from the No. 1 man—the day of the manned aircraft is not yet gone by a long way.

**Don't Count Out Planes**—Maj. Gen. B. A. Schriever, commander of the Air Force's Ballistic Missile

Division, Inglewood, Calif., says that the B-70 trisonic bomber is the "next logical step" in manned aircraft.

Looking ahead, if your business depends on the aircraft-missile dollar, both your immediate and long range prospects are very good indeed.

## Homes for Hawaii

East of Waikiki Beach, a \$350 million residential development—largest in Hawaiian history—is going up. It's a project of the Bishop Estate and the Henry J. Kaiser interests.

Plans call for housing and other facilities for 50,000 persons. Work will start within a few months on the 6000-acre site.

Business is booming in our 50th state. Construction is at an all time high.

## Meet Gyro-Glide

Northrop Aircraft is pushing its airliner-like monorail for use during Seattle's Century Exposition in 1961. (See photo.)

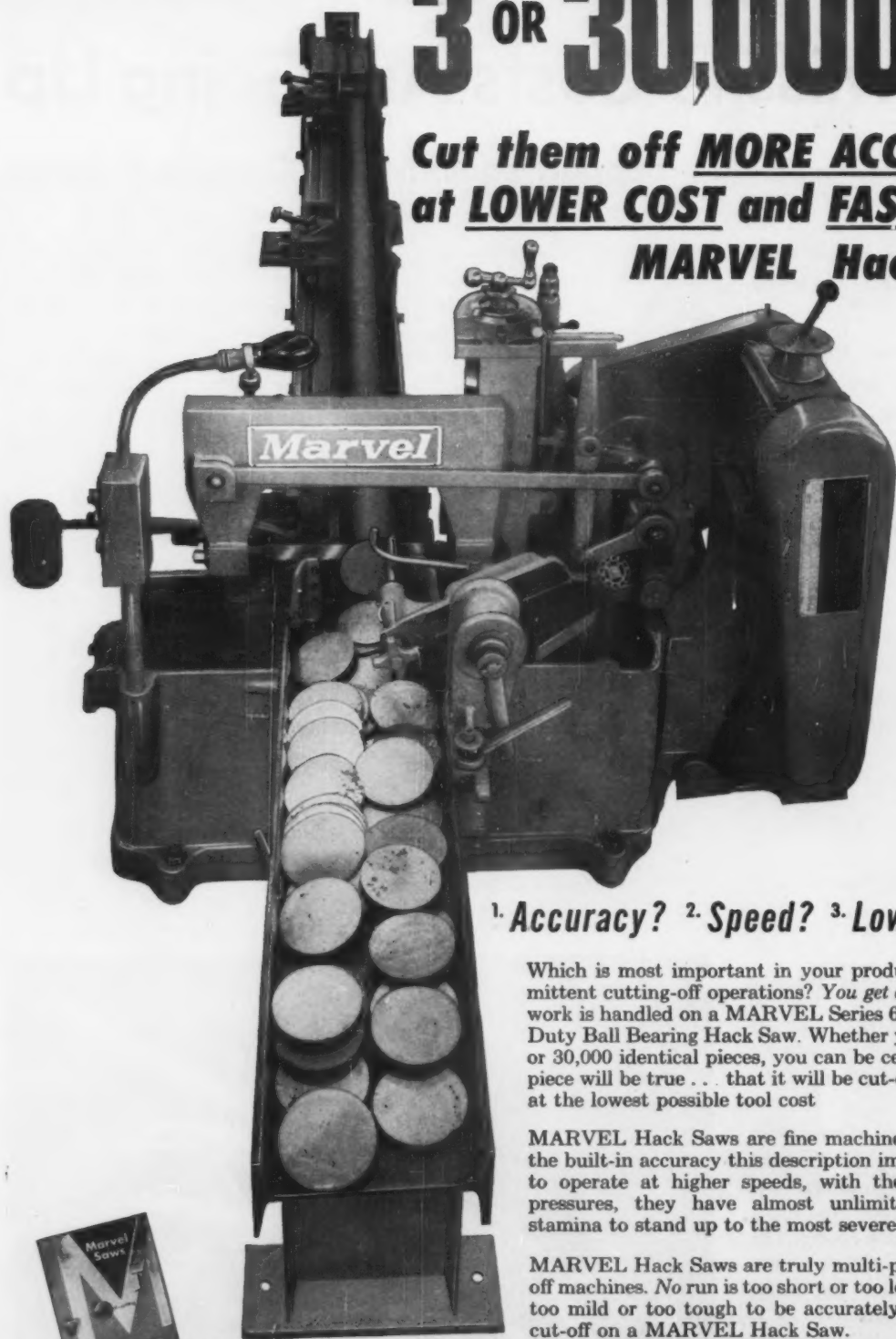
Northrop says its Gyro-Glide would travel at 150 mph. Actually, it's designed to serve community-wide rapid transit needs. And that's the market Northrop is eyeing. The company has made pitches to the cities of Los Angeles, San Francisco, and New Orleans.

Here's how Gyro-Glide works: It needs no continuous trolley wire, or powered rail. It picks up power while speeding along a short length of powered rail at each of the feeder stations along its route.



# 3 OR 30,000 PIECES

**Cut them off MORE ACCURATELY  
at LOWER COST and FASTER on a  
**MARVEL Hack Saw****



## <sup>1</sup> Accuracy? <sup>2</sup> Speed? <sup>3</sup> Low Cost?

Which is most important in your production or intermittent cutting-off operations? *You get all 3* when your work is handled on a MARVEL Series 6A or 9A Heavy Duty Ball Bearing Hack Saw. Whether you're cutting 3 or 30,000 identical pieces, you can be certain that each piece will be true . . . that it will be cut-off quickly, and at the lowest possible tool cost

MARVEL Hack Saws are fine machine tools, with all the built-in accuracy this description implies. Designed to operate at higher speeds, with the heaviest feed pressures, they have almost unlimited power and stamina to stand up to the most severe service.

MARVEL Hack Saws are truly multi-purpose cutting-off machines. No run is too short or too long, no material too mild or too tough to be accurately and efficiently cut-off on a MARVEL Hack Saw.



Catalog C85 has complete details, facts and figures on both Marvel metal cutting Hack Saws and Band Saws. Write for it today.

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S-1306

# New Numerical Control Device

Positioning Table Is Rugged and Fast, Yet Accurate

New entry in numerical controls scramble is made by American Tool Works Co.

It is punched tape controlled, and actuated by hydraulic motion.—By E. J. Egan, Jr.

■ Add another entry to the numerical control sweepstakes—a point-to-point positioning table for long or short runs on heavy duty drilling and boring jobs.

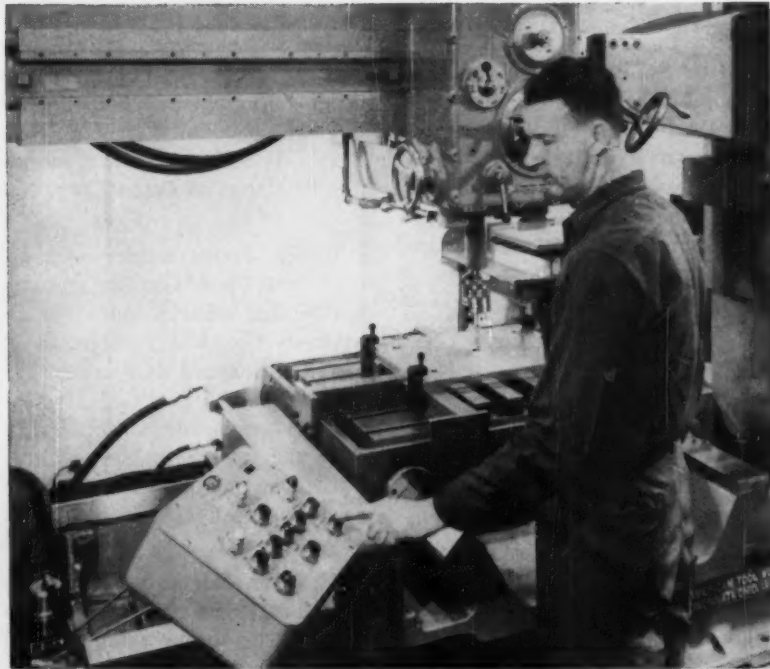
Wraps were taken off the punched paper tape controlled, hydraulic motion actuated, 8000-lb table this week by its developer. The American Tool Works Co., Cincinnati. For its demonstration workout, the unit was slung under one of the company's Hole Wizard radial drills.

Despite its rugged build, the new entry claims to concede nothing to the competition in either speed or accuracy.

It automatically positions a workpiece anywhere in a 20 x 30-in. working area, spotting it under the tool to within  $\pm 0.000250$  in. of the specified point on either the "x" or "y" axis. Repeat accuracy is within  $\pm 0.000050$  in., company officials say.

**How It Works**—An endless loop of standard punched paper tape relays its coded message through an electronic control system to direct the table from one position to the next. The table moves rapidly and simultaneously on both axes, and at a constant speed. There is no over-travel.

Table motion is entirely hydraulic. Company engineers point out there are no traversing screws or nuts to introduce backlash prob-



**JIG-BORER ACCURACY:** New tape controlled table lets Hole Wizard radial drill machine steel jig plates to 0.0003 in. bore-spacing tolerance.

lems, nor motors with inertia factors to counteract. By arranging the hydraulic cylinders in a balanced closed circuit, the table holds position rigidly when the pistons are at rest. There are no clamps to cause a shift in position.

**Fast Worker** — The endless punched tape needs no rewinding, of course. As soon as one workpiece is done, the tape loop is on the mark to start another. And since tapes are "read" by a low-pressure air stream passing through the holes, they stay on-size indefinitely. The air system also pressurizes the control cabinet to keep out dust and dirt.

## March Tool Orders Best in 19 Months

Net new orders of \$50.6 million made March the biggest new-business month since August, 1957 for U. S. machine tool makers. Here's the new-order box score with year-ago comparison:

### Metal Cutting Machine Tools

|            |                |
|------------|----------------|
| March 1959 | \$40.0 million |
| March 1958 | \$36.2 million |

### Metal Forming Machine Tools

|            |                |
|------------|----------------|
| March 1959 | \$10.6 million |
| March 1958 | \$ 6.7 million |



## INDUSTRIAL BRIEFS

**"Pop" Rivet Moves**—The "POP" Rivet Div. of United Shoe Machinery Corp., has moved to a new plant in Shelton, Conn. The building has 140,000 sq ft of manufacturing space and will feature new markets for riveting. Markets extend from toys to electronic hardware—from signs to curtain walls.

**New J & L Warehouse**—Jones & Laughlin Steel Warehouse Div., completed its new modern steel service center at 6901 Preston Highway in Louisville. The \$1 million building serves customers throughout eastern Kentucky, southern Indiana, and southern Illinois.

**Management Consultant**—Melvin W. Isaacson, former general sales manager, Metals Processing Div., Curtiss-Wright Corp. in Buffalo, has formed a management consulting firm, the M. W. Isaacson Co. The new firm, with offices at 95 Ruskin Rd., Eggertsville, and 420 Lexington Ave., New York, specializes in marketing and new product development in the metalworking industry.

**Branch Expansion**—Minneapolis-Honeywell Regulator Co. is establishing fully staffed branch offices of its Datamatic Div. in five cities. Branch offices have been opened in New York, Los Angeles, and Boston, and others will open May 1 in Chicago and Washington.



**Automatic Mill**—Completely automatic operation of blooming-slabbing mills is possible with a new card programmed control being proposed by Allis-Chalmers. With this control the operator will push a button to initiate action of an ingot. Complete rolling and manipulation of the ingot will then be done automatically.

**Brass Depot**—A new mill depot for brass rod products has been opened at Seymour, Conn., by Titan Metal Mfg. Co., Bellefonte, Pa. The depot will supply brass users in New England and metropolitan New York City. Titan became a subsidiary of Cerro de Pasco Corp. last month.

**Hands Across Border**—Industrial Metal Co. of Canada, Toronto, has become affiliated with Hyman-Michaels Co., Chicago. Industrial Metal will expand its operations in Ontario and provide Hyman-Michaels with added facilities to serve the steel mills in the Great Lakes area and abroad through the newly opened St. Lawrence Seaways.

**Tips for Salesmen**—How does an industry give its salesmen the kind of tools to make them invaluable to customers on whom they call? One answer will come from the National Screw Machine Products Assn. sales conference scheduled for Cleveland's Wade Park Manor Hotel, Aug. 19-20.

**Price Schedule**—A new pricing schedule has been published and is available from The Refractomet Div. of Universal-Cyclops Steel Corp., Bridgeville, Pa. The price book contains a new pricing schedule for molybdenum and molybdenum-titanium alloys.

**More Oxygen**—A new oxygen generating plant capable of producing 34 tons of oxygen per day is in operation at the Clairton Works of U. S. Steel Corp. About 80 pct of the oxygen produced is being utilized in the openhearth steel-making process. The plant was built and is owned and operated by Air Products, Inc., of Allentown, Pa.

**Canadian Rolling Mill**—Interprovincial Steel Corp., Ltd., is building a steel rolling mill at Regina, Sask., to cost \$15 million. The mill is planned for 100,000 tons annually, primarily for production of steel for the pipeline industry. It is expected to be completed and in operation early in 1960.

**Armco Drainage Expands**—A new \$½ million plant for the manufacture of welded pipe is being built near Livermore, Calif., by Armco Drainage & Metal Products, Inc. The plant will replace existing manufacturing facilities in Berkeley and serve the Rocky Mountain and Pacific Coast areas.

**Beatty Buys Tool Line**—Beatty Machine & Mfg. Co., Hammond, Ind., manufacturers of heavy metalworking equipment, has purchased the Quickwork line of machine tools from the Whiting Corp., Harvey, Ill. The Quickwork line includes stamping trimmers and rotary shears.

**Anaconda Controls Sequoia**—Anaconda Wire & Cable Co., has agreed to purchase 100 pct of the stock of Sequoia Wire & Cable Co., Redwood City, Calif., from Mandrel Industries, Inc. It will operate the company as a wholly-owned subsidiary for the manufacture of small wires for use in aircraft, missiles and electronic controls.

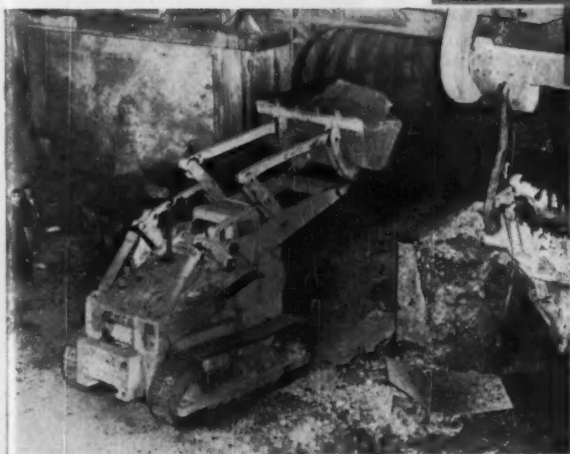
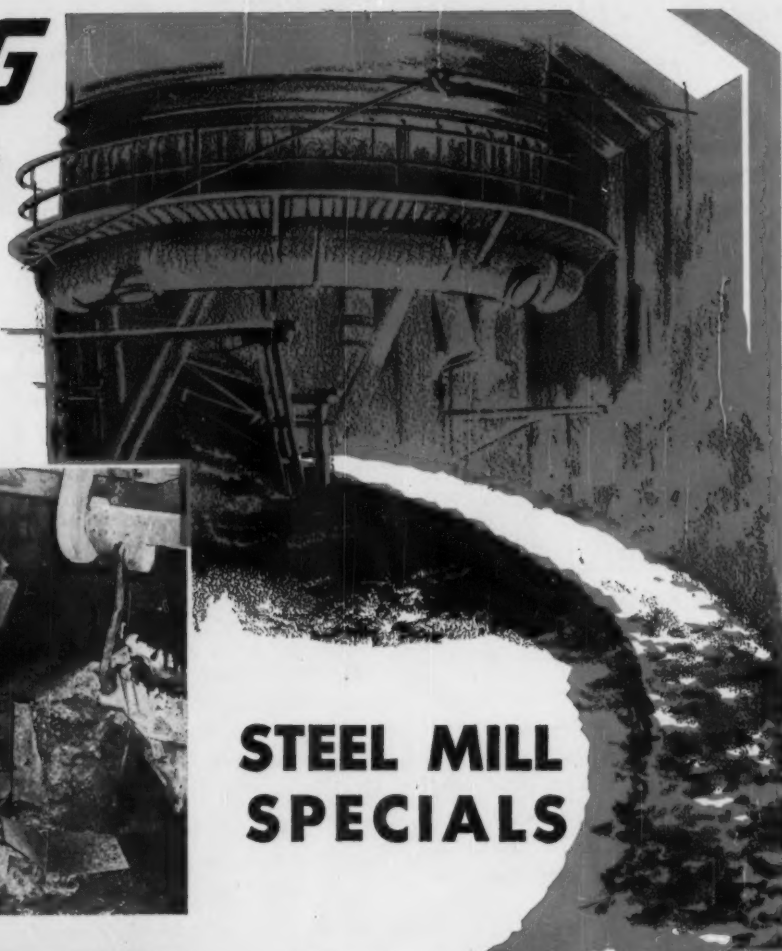
**Still for Ship**—Cleaver-Brooks Special Products, Waukesha, Wis., will provide distillation equipment for the \$5.6 million coast and geodetic survey ship being built by National Steel & Shipbuilding Corp. The vessel at NASSCO's San Diego yard, will be 292 ft long with delivery scheduled for late '59.

**Canadian Subsidiary**—Universal Marion Corp., has formed a Canadian subsidiary known as Marion Power Shovel Co. (Canada) Ltd., with headquarters at Seven Islands on the Gulf of St. Lawrence in Quebec. A warehouse will be built there and will act as a distribution center for equipment shipped from Marion, O., to Canadian customers.



# THE BIG

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## STEEL MILL SPECIALS



Eimco produces two special machines specifically engineered and built for steel mill use.

The Eimco Model 115 is a Steel Mill Excavator with fast overhead loading action . . . the ultimate in crawler-tractor excavator maneuverability.

The Eimco Model 135 is a Steel Mill Front End Loader with greater capacity, maneuverability and tremendous break-out force.

Like all Eimcos, both machines incorporate all the exclusive Eimco engineered and developed features, that mean greater work output, less down-time, easier operator control, rugged construction.

Designed and built to handle the tough work that is part of Open Hearth Plant operation, these slag loaders can greatly reduce your costs in ground flushing or slag pocket clean out . . . with ease, speed and safety.

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## MEN IN METALWORKING



**Michel Biscayart**, elected president, **E. W. Bliss Co.** (Paris).

**W. R. Jackson**, elected president and chief administrative officer, and **J. E. Jackson**, chairman of the board and chairman, Executive Committee; **T. G. Morris**, elected secretary-treasurer and **M. P. Cook**, asst. secretary, **Pittsburgh-Des Moines Steel Co.**

**J. R. McIlroy**, elected president, **Pittsburgh Pipe & Coupling Co.**, Allison Park, Pa.; **J. M. Lamond**, named chairman of the board; **Peter McIlroy**, becomes chairman, Executive Committee, and **M. E. Meese**, elected secretary-treasurer.



**W. O. Robertson**, named president, **Armco Drainage & Metal Products, Inc.**, Middletown, O.

**A. H. Leingang**, elected vice president, manufacturing, and director of sales, **The East Dayton Tool & Die Co.**, Dayton, O.; **R. A. Leingang**, appointed sales manager; **C. C. Hawkins, Jr.**, elected treasurer.

**E. D. Wilgus**, appointed vice president and sales manager, **Olympic Screw & Rivet Corp.**, Downey, Calif.

**F. B. Wolcott**, appointed executive vice president, **Sawhill Tubular Products, Inc.**, Sharon, Pa.

**E. W. Kimmell**, named assistant to the vice president and treasurer, **Penn Machine Co.**

**G. H. Fromer**, appointed vice president and general manager, **Atlas Drop Forge Co.**, Dana Corp.'s wholly-owned subsidiary at Lansing, Mich.

**O. C. Davis**, elected vice president and treasurer, **Vickers Inc.**, Div. of **Sperry Rand Corp.**

**H. E. Ehlers** and **W. A. Zimmer**, elected senior vice presidents, **Joseph Dixon Crucible Co.**, Jersey City, N. J.; **S. B. Seeley**, elected vice president, research.

**J. O. Phillips**, promoted to manager, forging and die steel sales, **Heppenstall Co.**, Pittsburgh.



**W. S. Mann**, named vice president, sales, **Armco Drainage & Metal Products, Inc.**



**M. C. Patton**, becomes chairman of the board, **Armco Drainage & Metal Products, Inc.**, Middletown, O.

**Myron Koyle**, named administrative assistant to vice president, foreign operations, **The Timken Roller Bearing Co.**

**J. T. Lurcott**, named product engineer, Product Engineering and Development Dept., **The Carpenter Steel Co.'s Alloy Tube Div.**, Union, N. J.

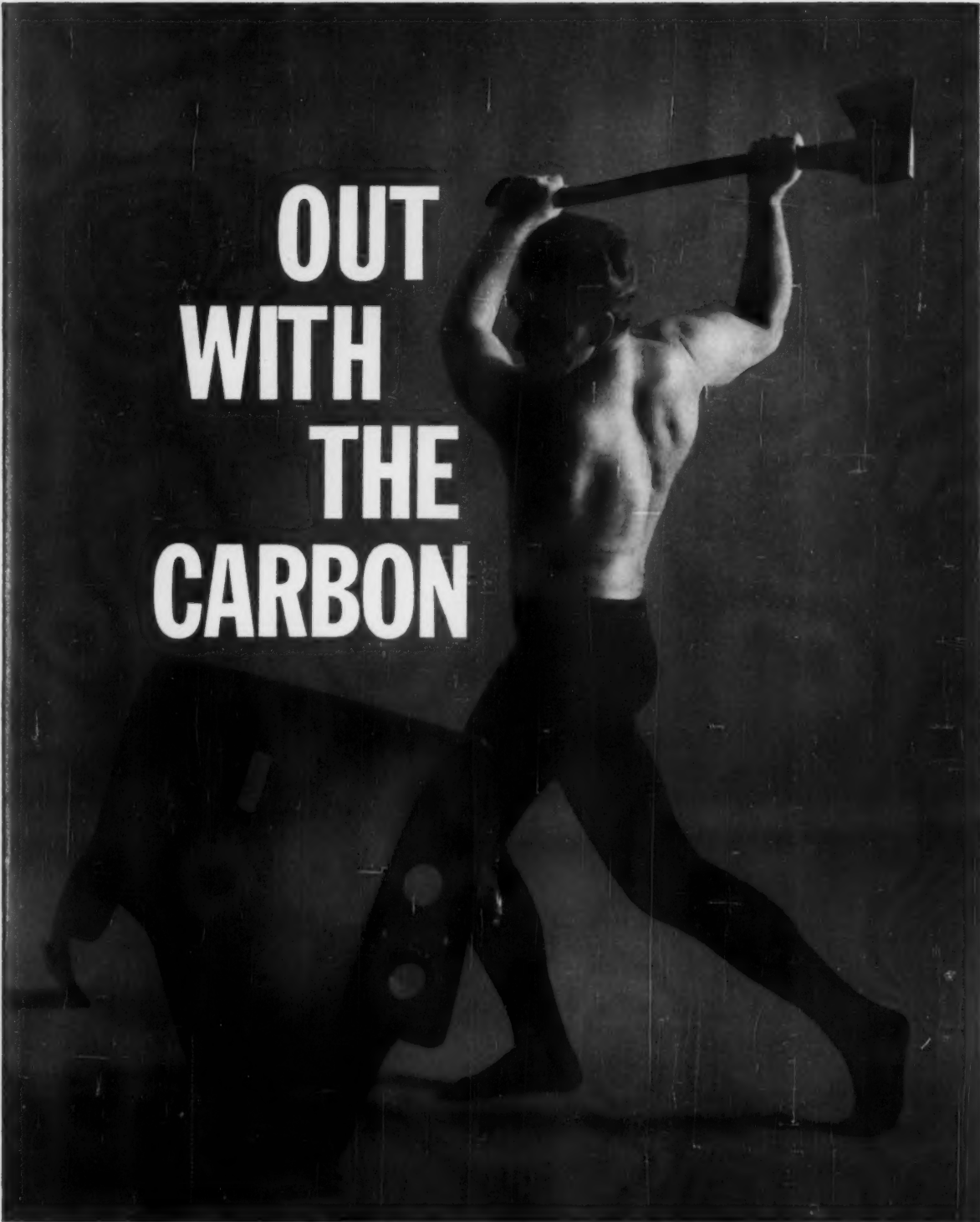
**R. W. Cowles, Jr.**, appointed New England representative, **Whit-on Chuck Div.**, **The Whiton Machine Co.**, New London, Conn.

(Continued on P. 101)



**C. W. Rudolph**, named purchasing agent, Philadelphia branch, **Disston Div.**, **H. K. Porter Co., Inc.**

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When you make deep drawing quality steel avoid the harmful effects of silicon *and* carbon by standardizing on *pure* manganese—ELECTROMANGANESE®. No carbon, no silicon, no other obnoxious impurities. What you need is what you get. Write for Bulletin 201 and price list to Technical Literature Section, Foote Mineral Company, 438 Eighteen West Cheltenham Building, Philadelphia 44, Pa., or Box 479, Knoxville 1, Tenn.







Photograph by Bruce Davidson

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Twenty years ago, Gus Heglund gathered a dozen skeptics around a jar of flux, a torch and some bits of aluminum. He was breaking trail for the man who now brazes 350 percolator spouts an hour . . . and for the company that will crack a new market with welded aluminum cans, churned out at 500 a minute.

Even when doubting Thomases

granted you could weld aluminum, they had to be taught how to do it. Gus Heglund and his Process Development crew gave lessons by the thousands. And their work between classes with alloys and techniques has led to the development of welded aluminum structures three times as strong as the best of the past.

Aluminum is second to no other metal

in variety of commercial joining methods. With the industry's largest staff of engineering specialists to solve your joining problems, *you get extra value in every pound of Alcoa® Aluminum you buy.* Call your local Alcoa sales office today; the man who answers will have the proof. Aluminum Company of America, 2018-D Alcoa Building, Pittsburgh 19, Pennsylvania.



**ALCOA helps you design it, make it, sell it**



## Alcoa has hundreds of Gus Hoglunds to help you design it, make it, sell it

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1. **Research Leadership**, bringing you the very latest in aluminum alloys and applications.
2. **Product Development** by specialists in your industry and your markets.
3. **Process Development Labs** for aid in finishing, joining and fabricating.
4. **Service Inspectors** to help solve production problems at your plant.
5. **Quality Control** to meet top standards or match your special needs.
6. **Complete Line** including all commercial forms, alloys, gages, tempers.
7. **Availability** via the nation's best stocked aluminum distributors.
8. **Foremost Library** of films and books to help you do more with aluminum.
9. **Trained Salesmen** with a wealth of on-the-spot information.
10. **Sales Administrators** constantly on call to service your orders.
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12. **The Alcoa Label**, leading symbol of quality aluminum, to mark your goods.

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(Continued from P. 98)

**L. A. Wible**, elected executive vice president, **Union Electric Steel Corp.**, Pittsburgh.

**W. R. Ebling**, appointed market and product analyst, Metallurgical Products Dept., **General Electric Co.**, Detroit.



**M. C. Shevchik**, appointed plant superintendent, **Disston Div., H. K. Porter Co., Inc.**

**Major Gen. T. C. Odom** (USAF Ret.) appointed director, systems management, **Military Products Div., International Business Machines Corp.**, New York.



**A. T. Richter**, promoted assistant general sales manager, **Midvale-Heppenstall Co.**, Nicetown, Pa.

The following positions are in the **Home Products Div. of Rheem Mfg. Co.** **R. B. Gilbert**, appointed national sales manager, heating and  
(Continued on P. 105)

# Large

or  
small



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# 4,769 years to arrive **ACCURATE HYDRAULIC**

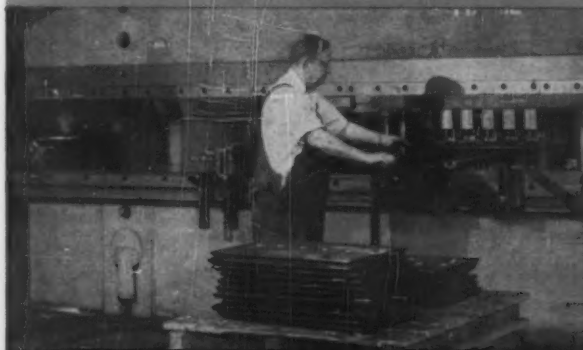


**122 out of 124 hydraulic press brakes  
in U.S. aircraft industry are PACIFIC**

Aircraft manufacturers work to the closest tolerances of all industries in metal forming. Douglas Aircraft Company, Tulsa, Oklahoma, with 8 Pacific Brakes (above) is typical of the airframe manufacturers who have selected Pacific for its precise accuracy.

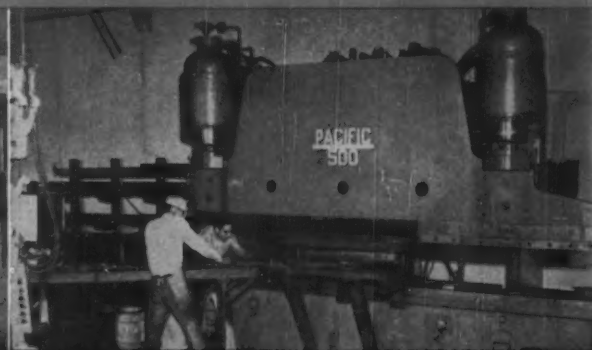
924 PACIFIC Brakes, representing over 95% of all hydraulic press brakes in use today, have operated for an aggregate of 4,769 years to test and confirm PACIFIC designs that have established hydraulic press brakes as far more profitable to operate than mechanical brakes. However, only PACIFIC has precise accuracy, versatility, high speed and dependability that comes from years of experience in manufacturing, developing and improving this unique machine. It is the only hydraulic press brake in daily operation that is actually air bending, straightening, deep drawing, blanking, and doing heavy punching. Accuracy within thousandths of an inch (greater than with any mechanical or other hydraulic brake) repeats itself on every stroke. Ram remains level regardless of location of work on the bed. PACIFIC sizes range from 60 tons to 1500 tons.

## **PACIFIC HYDRAULIC**



**Only hydraulic brake built for  
HEAVY PUNCHING**

Pacific is uniquely designed to absorb heavy shock from punching in the hydraulic system rather than in the frame of the brake. Cushioned against shock, punch and dies stand up from 3 to 8 times longer than with mechanical brakes. Photo (above) shows 1" alloy steel plate being punched at earthmoving equipment plant.

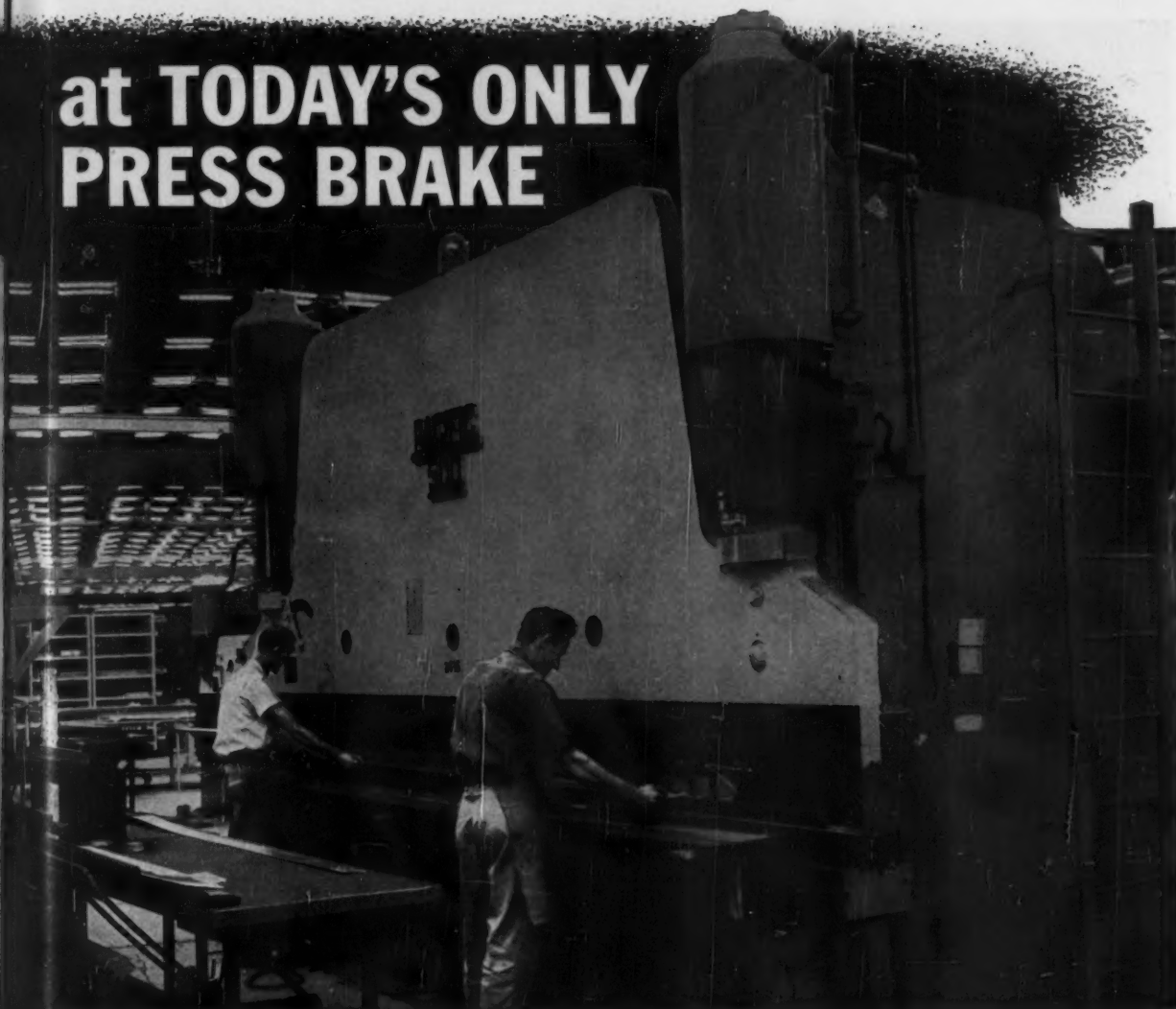


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Dependable, simplified electrical and hydraulic controls can easily be kept working continuously by any plant maintenance crew. There are no complicated electronic devices. In photo (above) at agricultural equipment plant, the 500 ton Pacific Hydraulic Brake shearing  $\frac{3}{4}$ " alloy steel plate with Pacific Shearing Attachment has operated continuously for the first 4 years at a cost of \$5.22 in replacement parts.



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operation**

Pacific adjustable stroke length can be shortened for rapid stroking. Automatic, self-leveling ram permits use of progressive dies across entire bed of press. The automatically-fed Pacific at automotive parts plant, which can cycle up to seventy  $1\frac{1}{2}$ " strokes per minute, is forming 3780 operations per hour in the above photo. In virtually any operation, Pacific's high cycling speed equals or exceeds materials handling capacity.

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**PLANTS:**

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## Plan Your Steel Insurance Now

With steel supply tightening up again and the possibility of a real scarcity in the months to come, it's nice to have your orders for plain and fabricated steel in the hands of a reliable and well-supplied organization.

Steel buyers everywhere know Levinson's reputation for having steel on hand . . . and for "fabrication that fits."

just . . . Leave it to **LEVINSON**

Warehousers, fabricators, designers of steel for over half a century

# LEVINSON

# STEEL



**COMPANY**

Pittsburgh 3, Pa.  
Phone HUbbard 1-3200

(Continued from P. 101)

air-conditioning products; **H. M. Gage**, appointed asst. general sales manager, administration; **R. E. James**, appointed national service manager, Home Products Div.



**H. S. Ferguson**, elected president, National Research Corp., Cambridge, Mass.

**H. K. Norris**, named production manager, Mechanical Goods Div., of United States Rubber Co.

**J. J. O'Brien**, appointed farm equipment branch manager at Richmond, Va., Allis-Chalmers Mfg. Co.; **J. B. Needham**, appointed farm equipment sales manager, Harrisburg branch.

**C. R. Riordan**, appointed director, sales, William Brand & Co., Inc., Willimantic, Conn., and Santa Monica, Calif.



**G. E. Zinniger**, appointed vice president, production and engineering, Ormet Corp.

## IT'S A FACT:

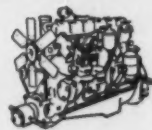
### ALLIS-CHALMERS LIFT TRUCKS SAVE YOU MORE... MAKE YOU MORE!

**HERE'S PROOF...** When it comes to sustained high production over the years — ability to stay on the job and out of the shop — Allis-Chalmers trucks have it! As these owners happily admit:



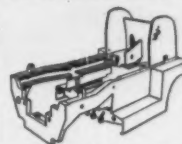
"Maintenance costs are one-third less than with lift trucks previously used" reports a Michigan factory. "We used to replace an engine a year," says the vice-president. Haven't replaced any in our Allis-Chalmers trucks."

**Reason:** The heavy-duty, industrial engine is the strongest and most rugged used in a fork truck.



**Downtime, None** — That's the report of a Florida cement block manufacturer. His 4,000-lb lift truck has operated steadily for more than three years.

**Reason:** Rugged construction of Allis-Chalmers trucks which is typified by automotive-type frames.



"They're tougher and require less maintenance," says the mechanic at a Wisconsin foundry. "I particularly like the overhead valves and wet cylinder liners — makes our job a lot easier."

**Reason:** Wet cylinder liners are easily replaced — no need to rebore.



"They're certainly accessible to work on," says the mechanic at a Missouri factory, "— although we have not had too much maintenance and no parts replaced at all so far."

**Reason:** A good example of accessibility: only 30 minutes is required to change a clutch.



Let your material handling dealer show you additional production and maintenance figures for Allis-Chalmers lift trucks that make their superiority a fact. Allis-Chalmers, Milwaukee 1, Wisconsin.



**ALLIS-CHALMERS**

BH-105

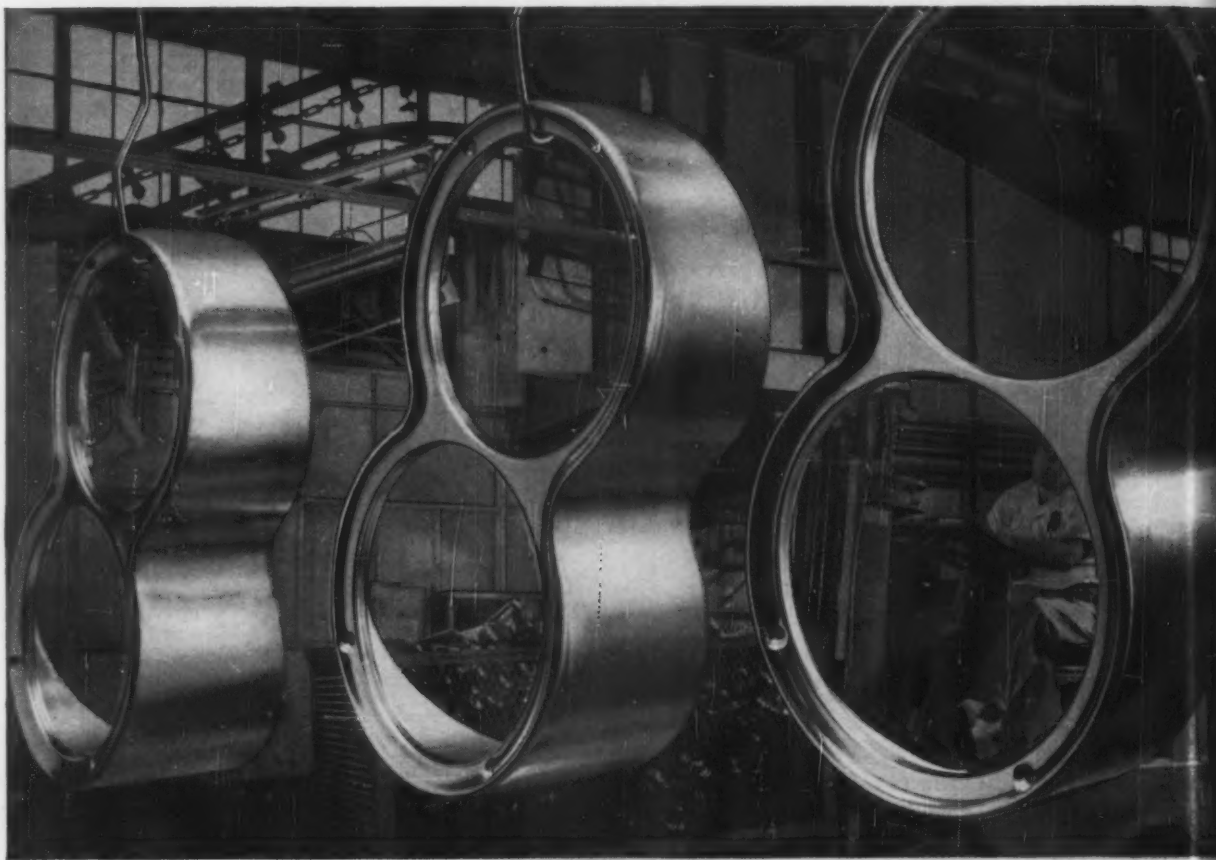
Plan  
to stay  
ahead...  
**MODERNIZE!**





## metal cleaning report no. 1


*case histories from your Dow Solvents Distributor*



Aluminum headlight assembly being cleaned in vapors of Dow trichloroethylene.

## DOW FIELD-LAB TEAM SOLVES DEGREASING RIDDLE

**Bay City, Mich.**—Manufacturer of auto parts reported faulty still was causing dirty distillate in his trichloroethylene degreasing operation. Dow field team went in, did thorough check of whole operation. Discovered not one, but three trouble spots: (1) Water separator on degreasing unit working improperly; (2) Excess water in stamping oil on parts being cleaned (Dow lab finding); (3) Faulty steam injection valve on still. Valve replaced, water separator repaired, and new stamping oil put in use. Plant now getting good cleaning action first time through vapor degreasing unit using Dow trichloroethylene. Key to solution was skill and thoroughness of trained Dow solvents team.



*Time and time again*, Dow solvents distributors help manufacturers improve cleaning and stripping operations. And for two good reasons: (1) Dow offers the widest line of chlorinated solvents for modern industry; (2) Dow backs its distributors to the hilt with technical information and on-the-job help. Chances are good that one of the many Dow industrial solvents can help smooth out your operations, too. Dow solvents are made to high purity standards and each is designed to do a specific job and do it well. For help on your metal cleaning problems, call on the nearby Dow solvents distributor.

**THE DOW CHEMICAL COMPANY • MIDLAND, MICH.**

#### **NEW COLD CLEANER SAVES BIG DOLLAR**

*Detroit, Mich.*—Expensive fluorinated cleaner was being used by manufacturer to remove paraffin oils from refrigeration compressors. Key requirement: clean parts without damaging insulation varnish on motor windings. Dow solvent team invited in. Observations pointed to Chlorothene® (Dow 1,1,1-trichloroethane, inhibited). Compressors cleaned with Chlorothene and air purged immediately after. Lab tests proved Chlorothene cleaned effectively, safely, without damaging insulating varnish. Company switched to Chlorothene, effected dollar savings while getting safe, sure cleaning.

#### **PERCHLOROETHYLENE KEY**

*Los Angeles, California*—Nationally known lock manufacturer was having difficulty cleaning plated metal parts. Door handles and face plates were coming off trichloroethylene degreasing line with marring water spots. Dow called in on problem. Recommended switch to Dow perchloroethylene. Higher boiling point and longer cleaning action resulted in spotless parts. Lock maker now saving time, money, with efficient perchloroethylene degreasing.



**FREE . . .  
TECHNICAL SERVICE  
on 24-hour notice**

Your Dow solvents distributor will gladly help you with any problems you're experiencing with metal cleaning solvents. He'll have a trained solvents specialist en route to your plant within 24 hours after your call is received!

Ask your Dow solvents distributor for details.

#### **STOP-OFF LACQUER STRIPPED FAST**

*Stratford, Conn.*—Major aircraft engine manufacturer was having trouble removing stop-off lacquer used on steel and aluminum parts selectively plated. Parts were being soaked and rinsed in flammable thinner. Process was slow, results unsatisfactory. Dow solvents distributor suggested vapor degreasing with Dow methylene chloride. Parts were run through vapors, then rinsed with spray lance application of m.c. System worked. Lacquer stripped off clean in matter of minutes. Flammability hazard eliminated. Problem marked solved.

**CHLOROTHENE®  
TRICHLOROETHYLENE  
PERCHLOROETHYLENE  
METHYLENE CHLORIDE**

**See Your Dow Solvents Distributor First!**

# FOR HELPFUL METAL CLEANING INFORMATION get in touch with your Dow Solvents Distributor



LETTER KEYS: (C)—Chloroethene®; (M)—Methylene Chloride; (P)—Perchloroethylene (Industrial); (T)—Trichloroethylene

**ALABAMA**  
BIRMINGHAM—Wittchen Chemical Company (C, M, P)  
BIRMINGHAM—F. H. Ross and Company (C, M, P)  
MOBILE—McKesson & Robbins, Inc. (C, M, P)  
MOBILE—F. H. Ross and Company (C, M, P)  
MONTGOMERY—Wittchen Chemical Company (C, M, P)

**ARIZONA**  
PHOENIX—Braun Chemical Company (C, M, P)  
PHOENIX—Western Chemical Company (C, M, P)  
TUCSON—Western Chemical Company (C, M, P)

**CALIFORNIA**  
LOS ANGELES—Braun Chemical Company (C, M, P)  
LOS ANGELES—McKesson, Wafford Chemical Division (P)  
LOS ANGELES—Pemaco, Inc. (P, T)  
SAN DIEGO—Braun Chemical Company (C, M, P)  
SAN DIEGO—Buel Town Company (T)  
SAN FRANCISCO—Braun-Knecht-Heimann Co. (C, M, P)  
SAN FRANCISCO—Phil L. Dostal Company (P)  
SAN FRANCISCO—G. N. Meacham Company (C)  
SOUTH GATE—American Mineral Spirits (P)

**COLORADO**  
DENVER—Braun-Knecht-Heimann Company (C, M)  
DENVER—Chemical Sales Company (C, M, P)  
DENVER—McKesson & Robbins, Inc. (C, M, P)  
DENVER—Mine and Smelter Supply Company (C, M, P)  
GRAND JUNCTION—C. D. Smith Co., Chemical Div. (C, P, T)

**CONNECTICUT**  
SHELTON—Axtor-Cross Company (C, M, P)  
SOUTH NORWALK—Guard-All Chemical Company (P, T)  
SOUTH NORWALK—McKesson and Robbins, Inc. (C, M, P, T)

**FLORIDA**  
JACKSONVILLE—F. H. Ross and Company (C, M, P, T)  
JACKSONVILLE—Amica Burnett Chemical Co. (C, M, P, T)  
MIAMI—Amica Burnett Chemical Company (C, M, P, T)  
MIAMI—Biscayne Chemical Laboratories (C, M, P, T)  
ORLANDO—Atlantic Chemicals, Inc. (C, M, P, T)  
TAMPA—Atlantic Chemicals, Inc. (C, M, P, T)

**GEORGIA**  
ATLANTA—McKesson and Robbins, Inc. (C, M, P, T)  
ATLANTA—F. H. Ross and Company (C, M, P, T)  
ATLANTA—Southern States Chemical Company (C, M, P, T)  
COLUMBUS—F. H. Ross and Company (C, M, P, T)  
DUBLIN—Textile Aniline Chemical Company (T)

**IDaho**  
BOISE—Van Waters and Rogers, Inc. (C, M, P)

**ILLINOIS**  
AURORA—River Valley Chemicals, Inc. (C, M, P, T)  
CHICAGO—Central Solvents and Chemicals (C, M, P)  
CHICAGO—C. P. Hall Company (C, M, P, T)  
CHICAGO—Keystone Aniline and Chemical Co. (C, P)  
CHICAGO—McKesson & Robbins, Inc. (C, M, P, T)  
CHICAGO—Joseph Turner and Company (C, M, P, T)  
DECATUR—McKesson & Robbins, Inc. (C, M, P, T)  
EFFINGHAM—Wabash Independent Oil Company (P, T)  
PEORIA—McKesson & Robbins, Inc. (C, M, P, T)  
ROCKFORD—Industrial Oil and Chemical Company (C)  
ROCKFORD—Viking Chemical Company (C, M, P, T)

**INDIANA**  
EVANSVILLE—Charles Leich and Company (P)  
FT. WAYNE—Hoosier Solvents and Chemicals (C, M, P)  
FT. WAYNE—Inland Chemical Corporation (C, M, P)  
HAMMOND—Inland Chemical Corporation (C, M, P, T)  
INDIANAPOLIS—Hoosier Solvents and Chemicals (C, M, P)  
INDIANAPOLIS—Wm. Lynn Chemical Company (C, M, P)  
INDIANAPOLIS—Lynn Solvents Corporation (T)  
INDIANAPOLIS—Ulrich Chemical Company, Inc. (T)  
KOKOMO—Plating Products, Inc. (P, T)  
LOGANSPOUT—Plating Products, Inc. (P, T)  
SOUTH BEND—Inland Chemical Corporation (C, M, P, T)  
SOUTH BEND—Stevens Oil Company (C, M, P)

**IOWA**  
BETTENDORF—Barton Naptha Corporation (C, M, P, T)  
BURLINGTON—McKesson and Robbins, Inc. (C, M, P, T)  
CEDAR RAPIDS—McKesson and Robbins, Inc. (C, M, P, T)  
COUNCIL BLUFFS—Barton Solvents, Inc. (C, M, P, T)  
DAYTON—McKesson & Robbins, Inc. (C, M, P, T)  
DES MOINES—Barton Naptha Company (C, M, P, T)  
SUMNER—Overton Chemical Sales (C)

**KANSAS**  
WICHITA—Reid Supply Company (C, P, T)

**KENTUCKY**  
LOUISVILLE—Dixie Solvents and Chemicals (C, M, P)  
LOUISVILLE—Gans Chemical and Supply Company (P)  
LOUISVILLE—McKesson and Robbins, Inc. (C, M, P, T)

**LOUISIANA**  
BATON ROUGE—Barada & Page, Inc. (C)  
NEW ORLEANS—Barada & Page, Inc. (C)  
NEW ORLEANS—Southern Solvents and Chemicals (C, M, P, T)

**MAINE**  
LEWISTON—Polar Chemical Company (C, M, P, T)

**MARYLAND**  
BALTIMORE—B. J. Howard Company (C, M, P, T)  
BALTIMORE—Leidy Chemicals Corporation (C, M, P, T)

**BALTIMORE**—Sailer Chemicals (C)  
BALTIMORE—Tilley Chemical Company (T)

**MASSACHUSETTS**  
BOSTON—Howe and French, Inc. (C, M)  
BOSTON—Linder and Company, Inc. (C, M, P, T)  
BOSTON—McKesson and Robbins, Inc. (C, M, P, T)  
EVERETT—Sessions-Gifford Co., Inc. (C, M, P, T)  
FRAMINGHAM—Axtor-Cross Corp. of Mass. (C, P, T)  
HINGHAM—Stephen-Roger, Incorporated (C, M, P, T)  
HOLYOKE—Eastern Chemicals, Inc. (M)  
SPRINGFIELD—Chemical Corporation (C, M, P, T)  
SPRINGFIELD—Hamden Color and Chemical Co. (C, M, P)  
STONEHAM—George Mann & Co. (C, M, P, T)  
WORCESTER—George H. Clark and Co. (C, M, P, T)

**MICHIGAN**  
DETROIT—Eaton Chemical and Dye stuff (C, M)  
DETROIT—Manpro Corporation (C, M, P, T)  
DETROIT—McKesson and Robbins, Inc. (C, M, P, T)  
DETROIT—Western Solvents and Chemicals (C, M, P)  
ESCANABA—Haviland Products Company (C, M, P)  
GRAND RAPIDS—P. B. Gast and Sons Company (C)  
GRAND RAPIDS—Haviland Products Company (C, M)  
GRAND RAPIDS—Wolverine Solvents and Chemicals Co. (C, M, P)  
LANSING—Carrier Stephens Company (C, P)  
LANSING—Wheaton Chemical Company (C, P, T)  
LUDINGTON—F. B. Gast and Sons Company (C)

**MINNESOTA**  
MINNEAPOLIS—W. H. Barber Company (P, T)  
MINNEAPOLIS—McKesson and Robbins, Inc. (C, M, P, T)  
MINNEAPOLIS—Triopol Refining Corporation (M, P, T)  
ST. PAUL—Lyons Chemicals, Inc. (C, M, P)

**MISSISSIPPI**  
JACKSON—F. H. Ross and Company (C, M, P)

**MISSOURI**  
KANSAS CITY—Barada and Page, Inc. (C, M)  
KANSAS CITY—Missouri Solvents and Chemicals (C, M, P)  
KANSAS CITY—Sherwood and Company, Inc. (C, M, P, T)  
ST. LOUIS—Independent Oil Company (C, M, P, T)  
ST. LOUIS—McKesson and Robbins, Inc. (C, M, P, T)  
ST. LOUIS—G. S. Robins and Company (C, M, P)  
ST. LOUIS—Missouri Solvents and Chemicals (C, M, P)

**NEBRASKA**  
OMAHA—Barton Solvents, Inc. (C, M, P, T)  
OMAHA—McKesson and Robbins, Inc. (C, M, P, T)

**NEW JERSEY**  
BLOOMFIELD—McKesson & Robbins, Inc. (C, M, P, T)  
CAMDEN—Callahan Chemical Company (M, P, T)  
EAST PATERSON—Aetna Color and Chemical Company (C, M, P, T)  
MURRAY HILL—American Mineral Spirits (C, M, P, T)  
NEWARK—American Oil and Supply (C, P)  
NEWARK—National Oil and Supply Company (C, M, P, T)  
VINELAND—Liria Chemical Company (C, T)

**NEW MEXICO**  
ALBUQUERQUE—Braun Chemical Company (C, M, P, T)  
ALBUQUERQUE—Edmunds Chemical Company (C, M, P, T)

**NEW YORK**  
ALBANY—Eastern Chemical (C, M, P, T)  
ATHENS—Spick Products Company (P, T)  
BINGHAMTON—Collier Chem. (C, M)  
BRONX—Bco Solvents Corporation (M, P, T)  
BROOKLYN—Enquist Chemical Company (C, P)  
BUFFALO—Buffalo Solvents and Chemicals (C, M, P)  
BUFFALO—Chemical Sales Corporation (C, M, P, T)  
BUFFALO—McKesson and Robbins, Inc. (C, M, P, T)  
EDGEWATER—Hagan Industrial Supply (P, T)  
GLOVERSVILLE—Eastern Chemicals, S. H. Ireland Div. (C, M)  
KEARNY—American Chemicals, Incorporated (C, M, P, T)  
LONG ISLAND CITY—Peerless Oil and Chemical (C, M, P, T)  
NEW YORK—American Chemicals, Inc. (C, M, P, T)  
NEW YORK—McKesson and Robbins, Inc. (C, M, P, T)  
POUGHKEEPSIE—Dusa Chemical Company (C)  
ROCHESTER—Eastern Chemicals, Inc. (C, M)  
ROCHESTER—Chemical Sales Corporation (C, M, P, T)  
SYRACUSE—Eastern Chemicals, Inc. (C, M)  
UTICA—Monarch Laboratories (C, M, P)

**NORTH CAROLINA**  
CHARLOTTE—F. H. Ross and Company, Inc. (C, M, P, T)  
CHARLOTTE—Moreland Chemical Company (C, M, P, T)  
CHARLOTTE—Southern States Chemical Co. (C, M, P, T)  
GREENSBORO—F. H. Ross and Company, Inc. (C, M, P, T)

**OHIO**  
AKRON—Farley Solvents Company (C, M, P, T)  
AKRON—C. P. Hall Company (C, P, T)  
CANTON—Bison Corporation (C, P, T)  
CINCINNATI—Amica Solvents and Chemicals (C, M, P)  
CINCINNATI—Chipman Supply Company (T)  
CINCINNATI—Herbert Chemical Company (P, T)  
CINCINNATI—McKesson and Robbins, Inc. (C, M, P, T)  
CLEVELAND—Man-Gill Chemical Company (C, P, T)  
CLEVELAND—McKesson and Robbins, Inc. (C, M, P, T)  
CLEVELAND—National Solvents Corporation (C, P, T)  
CLEVELAND—Ohio Solvents and Chemicals, Inc. (C, M, P)  
CLEVELAND—R. W. Renton Company (C, P, T)

**COLUMBUS**—McKesson and Robbins, Inc. (C, M, P, T)  
DAYTON—Industrial Chemical Products Co. (C, P, T)  
DAYTON—Ottoson Solvents, Inc. (T)  
LIMA—Thomson Chemical Company (C, P, T)  
TOLEDO—Inland Chemical Co. (C, M, P, T)  
TOLEDO—Toledo Solvents and Chemicals (C, M, P)  
TOLEDO—M. I. Wilcox Company (C, P, T)  
YOUNGSTOWN—Rhie Supply Company (C, M, P, T)

**OKLAHOMA**  
OKLAHOMA CITY—Barada and Page, Inc. (C, M)  
TULSA—Chemical Products, Inc. (C, M, P, T)

**OREGON**  
PORTLAND—Van Waters and Rogers (C, M, P)

**PENNSYLVANIA**  
CONSHOHOCKEN—American Mineral Spirits (C, M, P, T)  
EASTON—Lehigh Valley Chemical Company (C, M, P, T)  
ERIE—Monarch Laboratories (T)  
McKEES ROCK—Apex Soap and Sanitary Corp. (C, P, T)  
PHILADELPHIA—Alex C. Ferguson Company (C, P, T)  
PHILADELPHIA—McKesson and Robbins, Inc. (C, M, P, T)  
PHILADELPHIA—Phillips and Jacobs, Inc. (C, M)  
PHILADELPHIA—Pioneer Salt Company (C, M, P, T)  
PHILADELPHIA—George Senn, Inc. (C, M, P, T)  
PITTSBURGH—Carmac Chemical Company, Inc. (C, P)  
PITTSBURGH—Carmac-Pittsburgh Company (C, P, T)  
PITTSBURGH—Dacar Chemical Products Company (C, P, T)  
PITTSBURGH—Fr. Pitt Chemical Company (C, M, P)  
PITTSBURGH—McKesson and Robbins, Inc. (C, M, P, T)  
READING—R. W. Eaken, Inc. (C, P, T)  
READING—Textile Chemical Company (C, P)  
SCRANTON—Scranton Chemical Company (C, P, T)  
YORK—Industrial Solvents and Chemicals (C, P, T)

**RHODE ISLAND**  
PROVIDENCE—George Mann and Company (C, M, P, T)  
PROVIDENCE—Sessions-Gifford Company, Inc. (C, M, P, T)

**SOUTH CAROLINA**  
CHARLESTON—Burriss Chemical Company (C, P, T)  
GREENVILLE—F. H. Ross and Company (C, M, P, T)  
GREENVILLE—Southern States Chemical Co. (C, M, P, T)  
SPARTANBURG—Moreland Chemical Company, Inc. (C, M, P, T)

**TENNESSEE**  
CHATTANOOGA—Chapman Chemical Co. (C, M, P, T)  
CHATTANOOGA—Wilson Sales Company (C, M, P, T)  
KINGSPORT—Chem-I-Dent, Inc. (C, P, T)  
MEMPHIS—Chapman Chemical Company (C, M, P, T)  
MEMPHIS—C. P. Hall Company (C, M, P, T)  
MEMPHIS—Ideal Chemical and Supply Co. (C, M, P, T)  
NASHVILLE—Chapman Chemical Company (C, M, P, T)  
NASHVILLE—Wilson Sales Company (C, M, P, T)

**TEXAS**  
AMARILLO—State Chemical Company (C, M, P, T)  
AUSTIN—R. M. Hughes Company, Inc. (C, M, P, T)  
BEAUMONT—Arthur Dooley and Son (C, M, P, T)  
CORPUS CHRISTI—Barada and Page, Inc. (C, M)  
DALLAS—Barada and Page, Inc. (C, M)  
DALLAS—McKesson & Robbins, Inc. (C, M, P, T)  
DALLAS—Texas Solvents and Chemicals Co. (C)  
DALLAS—Van Waters and Rogers, Inc. (C, M, P, T)  
EL PASO—Baron Chemical Company (C, M, P, T)  
EL PASO—Braun Chemical Company (C, M, P, T)  
EL PASO—Mine and Smelter Supply Company (P)  
FORT WORTH—Worth Chemical Products Co. (C, M, P)  
HOUSTON—Barada and Page, Inc. (C, M)  
HOUSTON—W. H. Curtin and Company (P)  
HOUSTON—Dixie Chemical Company (C, M, P, T)  
HOUSTON—R. M. Hughes Company, Inc. (C, M, P, T)  
HOUSTON—McKesson, Texas Chemical Division (C, M, P, T)  
HOUSTON—Texas Solvents and Chemicals Co. (C, M, P)  
HOUSTON—Van Waters and Rogers, Inc. (C, M, P, T)  
LUBBOCK—State Chemical Company (C, M, P, T)  
MIDLAND—State Chemical Company (C, M, P, T)  
SAN ANTONIO—R. M. Hughes Company, Inc. (C, M, P, T)  
SAN ANTONIO—McKesson and Robbins, Inc. (C, M, P, T)

**UTAH**  
SALT LAKE CITY—Braun-Knecht-Heimann Co. (C, M, P, T)

**VIRGINIA**  
NORFOLK—Taylor Salt and Chemical Company (C, P, T)  
RICHMOND—Phipps and Bird, Inc. (C, M, P)  
ROANOKE—Havner Supply Company (C, M, P, T)

**WASHINGTON**  
SEATTLE—Van Waters and Rogers, Inc. (C, M, P)  
SPOKANE—Van Waters and Rogers, Inc. (C, M, P)

**WEST VIRGINIA**  
CHARLESTON—B. Preiser and Company (C, M, P, T)  
FAIRMONT—Fairmont Machinery, Fairmont Supply (C, P, T)  
HUNTINGTON—Cabell Chemical Company (C, P, T)

**WISCONSIN**  
CHIPPEWA FALLS—Lyons Chemical (C, M, P, T)  
LACROSSE—Wisconsin Solvents & Chemicals Corp. (C, M, P)  
MADISON—North Central Chemicals (C, M, P, T)  
MILWAUKEE—McKesson and Robbins, Inc. (C, M, P, T)  
MILWAUKEE—Wisconsin Solvents and Chemicals (C, M, P)  
WAUKESHA—Fred Parls and Son (C, T)

## See Your Dow Solvents Distributor First!





## How To Get More For Your Metalworking Dollar

# Tool Steels

## With a Directory of AISI Types

### IN THIS FEATURE

Tool steels are indispensable to almost every metal fabricating technique. Success or failure in drilling, stamping, cutting, forging, drawing so often depend on the tools used—their design and the alloy from which they are made.

This makes selection of the most appropriate tool steel for a given job a major decision in virtually all metalworking operations.

In recent years, tool steels have also found important application as structural materials. Here they are competing directly with

high-strength steel, stainless and high temperature alloys.

The broadening scope of tool steel applications has further complicated selection—a job already complicated by the hundreds of brand name tool steels on the market.

Can selection be simplified?

This feature briefly reviews each major type of tool steel, citing its application in specific metalworking operations. It provides a directory of steels classified by AISI types—making selection easier.

# Water Hardening Steels Are Easy To Heat Treat

**With little or no alloy content, water hardening tool steels are low in cost but unusually versatile.**

**That they can be quenched in water or brine is often an advantage.**

■ Water hardening tool steels are of two general types. Some are plain carbon steels. Others contain small amounts of chromium or vanadium, singly or in combination. (Small amounts of other elements—such

as molybdenum—can also be added to water hardening grades.) All water-hardening grades are relatively easy to heat treat. Decarburization is not a critical problem.

Despite the inroads made by the more complex alloys, these steels are still recommended for a variety of applications. Although simple in chemistry, they are "quality" steels. Their chemistry and hardenability are held to exacting limits.

**Good Combination**—They can be machined with ease. In the heat

treated condition, they provide a hard surface and a tough core. Because they can be hardened in water, they are subject to some warpage or distortion. This factor should be taken into account when designing or setting dimensional tolerances.

According to the AISI system, all water hardening tool steels are identified by the letter W. Seven "W" grades are listed, with carbon contents ranging from a low of 0.60 pct to a high of 1.40 pct. Maximum alloy content (for these grades containing chromium or vanadium) does not exceed about 1 pct total.

Although silicon and manganese are not listed as special alloying elements in these steels, these elements play (along with carbon content) an important role in determining final properties. Both hardenability and grain size, for example, are affected by varying the contained amounts of these elements. They also have a marked influence on such factors as forgeability, machinability, and response to heat treatment.

**Carbon Important**—In virtually all water hardening grades, carbon content can be linked directly to response to heat treatment and optimum end use. The lower carbon steels are tough and resist shock or impact. But they lack the hardness of the higher carbon grades. Consequently, the higher carbon grades have more abrasion resistance and will provide a better cutting edge.

A major producer has compiled a list of typical applications for plain carbon tool steels according to carbon content. The list is in-

## Carbon Content vs Application

| Carbon Range Pct. | Type of Tool   | Carbon Range Pct.              | Type of Tool   |
|-------------------|--|--------------------------------|--|
| .50-.54           | Machinery Parts<br>Hammers<br>Forging Dies                   | Carbon Range, pct<br>1.00-1.04 | Blanking Dies<br>Masons' Tools<br>Axiors                       |
| .55-.59           | Machinery Parts<br>Sledges<br>Smiths' Tools                  | 1.05-1.09                      | Axe Bits<br>Wood Bits<br>Large Milling Cutters<br>Spring Steel |
| .60-.64           | Hot Bolt Headers<br>Cold Sets<br>Very Large Shear Blades     | 1.10-1.14                      | Reamers<br>Threading Dies<br>Boring Tools                      |
| .65-.69           | Auger Bits<br>Cupping Tools<br>Hot Forging Dies              | 1.15-1.19                      | Taps<br>Cutter Blanks<br>Paper Dies<br>Flat Drills             |
| .70-.74           | Hot Sets<br>Pinch Bars<br>Hot Chisels                        | 1.20-1.24                      | Woodworking Tools<br>Slotting Tools<br>Twist Drills            |
| .75-.79           | Wedges<br>Track Tools<br>Medium Shear Blades                 | 1.25-1.29                      | Nail Cutters<br>Stone Planers<br>Reamer Blades                 |
| .80-.84           | Caulking Tools<br>Hammer Dies<br>Large Punches               | 1.30-1.34                      | Wood Chisels<br>Flue Cutters<br>Lathe Tools                    |
| .85-.89           | Shear Blades<br>Rivet Sets<br>Chipping Chisels               | 1.35-1.39                      | Razor Blades<br>Brass Turning Tools<br>Cabinet Files           |
| .90-.94           | Trimming Dies<br>Punches<br>Hand Chisels                     | 1.40-1.44                      | Fine Cutters<br>Wire Drawing Dies<br>Engravers' Tools          |
| .95-.99           | Drop Forging Dies<br>Cold Heading Dies<br>Large Shear Blades |                                |  |

Courtesy Allegheny Ludlum Steel Corp.

cluded in this section in order to simplify selection and to help clarify the importance of carbon range.

**Without Delay**—All plain carbon steels are subject to grain coarsening. For this reason, they should be forged just as soon as they reach proper forging temperatures. Also, it should be remembered that the grain coarsening tendency is increased with an increase in forging temperature and time at temperature. Most plain carbon grades can be forged in the range of 1700°-1950°F.

According to Allegheny Ludlum metallurgists, "heavy blows should be used at first, then rapid light blows, finishing at dull red heat, 1350°-1400°F. After forging, it is desirable, particularly in the case of large sections, to normalize before annealing. With the carbon content below 1 pct, a normalizing range of 1500°-1600°F is recommended, and with the carbon over 1 pct, 1550°-1650°F."

**Annealing Tips**—Most water hardening tool steels can be annealed at temperatures from 1375° to 1450°F, depending upon carbon content. Proper annealing implies that heating must be thorough and uniform. Some heat treaters prefer pack annealing to avoid decarburization. After heating, these steels should be cooled slowly in a furnace. Hardness after annealing should not exceed BHN 196.

In general, hardening temperatures range from 1450° to 1550°F. It is common practice for the supplier to indicate the optimum hardening temperature range for a particular grade. Close temperature control is important to achieve best results.

Carbon tool steels may be quenched in water or brine. Heavier sections may require a more drastic quench in order to obtain desired hardness. In a number of cases, the steel producer specifies a brine quench. Such recommenda-

tions should be carefully followed if maximum hardness is required.

**Guide Posts**—Other suggestions passed along by the steel producer are also worth heeding. In the case of certain water hardening grades, for example, The Carpenter Steel Co. recommends that blind holes or through holes close to the edge of a part should be packed with steel wool. Neither asbestos nor clay should be substituted. This is sound advice based on long familiarity with the response of specific grades.

Every major tool steel producer provides a full set of instructions on the heat treatment of water hardening steels. Make sure you follow the rules that apply to the specific grade you're dealing with.

Tempering relieves hardening strains and improves toughness. An accompanying chart shows how a 1.05 pct carbon steel may be expected to respond to various drawing temperatures.

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■ How to Get More for Your Tool Steels Dollar | Section 2

## Shock Resisting Grades Suit Many Tooling Needs

**As the name implies, these steels have the toughness to withstand severe impact.**

**Whether it's a simple hand chisel or a complex forging die, here are steels that can tackle the job.**

■ Shock resisting tool steels are of either the low or intermediate alloy types. Their carbon content does not, as a rule, exceed about 0.55 pct. Principal alloying combinations include manganese-silicon, silicon-

molybdenum, and chromium-tungsten. Some grades also contain small amounts of vanadium. They are identified by the AISI symbol "S."

The low-alloy grades will generally contain no more than about 3 pct total alloy content. Intermediate alloy grades contain as much as 5 or 6 pct alloy. Because of the variety of proprietary grades available, it is often difficult to draw a sure line of distinction between low and intermediate alloys. Metallurgically, the distribution is not always clear-cut.

**For Toughness**—No single quenching medium is specified for all of these grades. Some can be quenched in either water or oil. Others must be quenched in oil. For this reason, it is essential to follow the producer's recommendations for each particular grade.

Usually, the steels with higher alloy content must be oil quenched. Along with their superior strength and toughness, these grades can be used for some hot work applications. Their fatigue strength is good



and they can withstand considerable bending.

**Forging Pointers**—The low alloy grades are frequently silico-manganese steels. They can achieve a high

degree of hardness with almost no sacrifice in toughness. Manganese and silicon contents contribute to their wear resistance.

For forging, it is good practice to

heat these steels to forging temperature at a slow rate. These are relatively dense materials, so that pronounced thermal shock or upset can result in cracking. Soaking at high heat should be avoided in order to minimize decarburization.

The normal range of forging temperatures for shock resisting tool steels lies between 1850° and 2050°F. In most cases, it is not advisable to forge these materials at temperatures below 1600°F. Forging should proceed as soon as proper forging temperature is achieved.

**Add Anneal**—Slow cooling from the forging temperature is generally advised. For some grades, it is good practice to go to the annealing furnace immediately after forging and while the steel is still hot. This provides further insurance against the possibility of cracking.

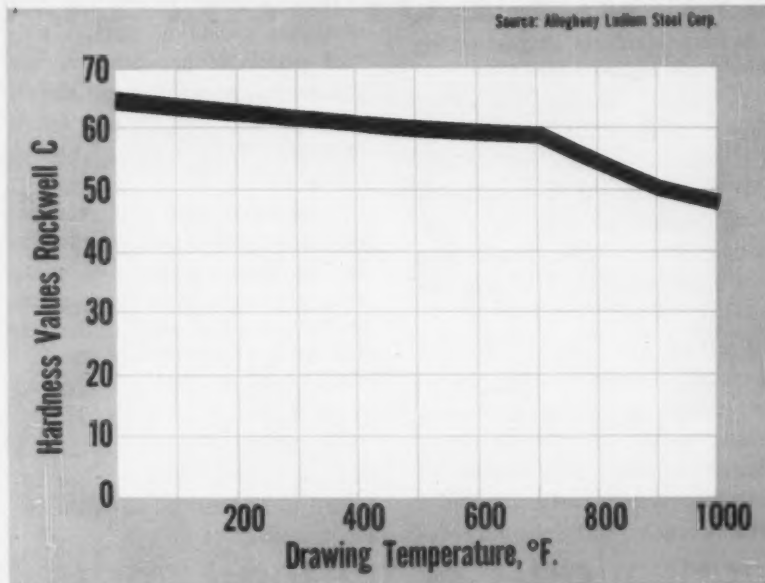
Annealing temperatures for these steels range from 1400° to 1500°F. Some exhibit fair resistance to decarburization. Others tend to decarburize readily. Unless all decarburized areas are to be removed in subsequent machining, these steels should be properly protected against decarburization.

In hardening, too, it is advisable to provide either a protective atmosphere or a chemically inert packing medium. Again, the rate of heating should be slow. With some grades a preheat is recommended. Normally, hardening temperatures range from 1500° to 1700°F. In the case of a few alloys, austenitizing temperatures may go as high as 1850°F. This high temperature is not essential for proper hardening, however.

**Higher Heats**—When a preheat is required, the range of preheat temperatures is likely to be between 1150° and 1250°F. The higher austenitizing temperatures are more frequently used when parts are to be air hardened.

All of these steels have a fairly high resistance to softening. Some idea of the tempering characteristics of lower alloy grades can be gained from the accompanying chart.

## Drawing An S5-Type Tool Steel



## Typical Applications

### LOW ALLOY TYPES

Hand Chisels  
Pneumatic Chisels  
Drift Pins  
Blacksmiths' Tools  
Hand Screw Driver Bits  
Power Screw Driver Bits  
Rivet Busters  
Clutch Pins  
Large Forming Tools

Large Bending Tools  
Shear Blades  
Rivet Sets  
Track Mauls  
Expanders  
Mandrels  
Concrete Busters  
Pipe Cutters  
Machine Parts

Cold Coining Dies  
Cold Coining Punches  
Nail Sets  
Tool Shanks  
Center Punches  
Impact Punches  
Rotary Hand Shears  
Small Gears  
Spindles  
Knock-Out Pins

### INTERMEDIATE ALLOY TYPES, COLD WORK

Beading Tools  
Backing Out Punches  
Boilermakers' Tools  
Blacksmiths' Tools  
Bolt Clippers  
Bulldozing Dies  
Chipping Chisels

Caulking Chisels  
Cold Sets  
Circular Pipe Cutters  
Concrete Drills  
Expander Rolls  
Mandrels  
Marking Stamps

Punches  
Pneumatic Tools  
Rivet Busters  
Scarfing Tools  
Swages  
Shear Blades  
Tappets  
Track Tools

### HOT WORK

Forging Dies  
Hot Drop Dies and Inserts

Hot Heading and Forming Tools  
Grippers

Mandrels  
Punches  
Shear Blades  
Swages

Courtesy Universal-Cyclops Steel Corp.

# When To Use Cold Work Steels

There are three general types of cold work tool steels to choose from. Their alloy content may vary considerably.

Make sure your choice is tailored to a specific application.

All cold work tool steels have a high carbon content, ranging from 0.90 to over 2.00 pct in most cases. Their alloy content, however, ranges from quite low (total of 2-3 pct) to a high that compares with some stainless grades (13-18 pct).

For this reason, the AISI has classified these steels in three general groups. The oil hardening types are low alloy grades and are identified by the symbol "O." Air hardening alloys with medium alloy content (usually under 6 pct total) bear the symbol "A." A third group combining high carbon with high (12 pct) chromium are identified by the symbol "D."

**Check Application**—Obviously, steels with so wide a spread in chemistry must differ appreciably in both their mechanical properties and fields of application. This is certainly the case. Apparently, the main reason for grouping these varieties under a single heading stems from the fact that all grades can be used for some form of cold work die steel application.

The non-deforming properties of the low alloy "O" types are very good. Essentially, this means that these steels will not warp, deform, or "shrink" as a result of hardening and tempering. This is a basic requirement for a satisfactory die steel. It must be qualified to some extent, however. To finish up in a non-deformed condition, heat treatment of these steels must be optimum.

**Tough Steels** — The "O" steels

## How They Can Be Used

### OIL HARDENING

Threading Dies  
Gauges  
Broaches  
Master Tools

Blanking Dies  
Plastic Mold Dies  
Drawing Dies  
Reamers  
Taps

Shear Blades  
Trimming Dies  
Thread Rolling Dies  
Coining Dies  
Paper Knives

### AIR HARDENING

Thread Rolling Dies  
Gauges  
Master Tools  
Machine Tool Ways  
Knurls  
Spinning Rolls

Forming Rolls  
Extrusion Dies  
Deep Drawing Dies  
Slitters  
Clutches  
Lathe Centers  
Broaches

Burnishing Tools  
Trimming Dies  
Blanking Dies  
Mandrels  
Coining Dies  
Shear Blades  
High Grade Tool Shanks

### HIGH CARBON - HIGH CHROME

Punches  
Gauges  
Forming Rolls  
Knurls  
Wearing Parts  
Master Parts  
Shear Blades

Slitters  
Burnishing Tools  
Lathe Centers  
Seaming Rolls  
Dies  
Lamination  
Drawing

Thread Rolling  
Blanking  
Cold Forming  
Coining  
Trimming  
Swaging

Courtesy Universal-Cyclope Steel Corp.

are readily forged in the range of 1800° to 2000°F. Annealed at about 1450°F, they are not difficult to machine. In the hardened condition, they are tough and highly wear resistant. Their resistance to tempering is generally poor.

The air hardening ("A") steels are more highly alloyed, principally with chromium, manganese, molybdenum, and — to a lesser degree — vanadium. Because they can be fully hardened without a liquid quenchant, their non-deforming properties are excellent. Their resistance to abrasive wear varies from fair to very good.

A major reason for choosing these steels for more intricately shaped dies, tools, and machinery parts is to be found in their combination of long life and lack of distortion. Even those alloys requiring higher austenitizing temperatures (2000°F) are relatively free of warpage.

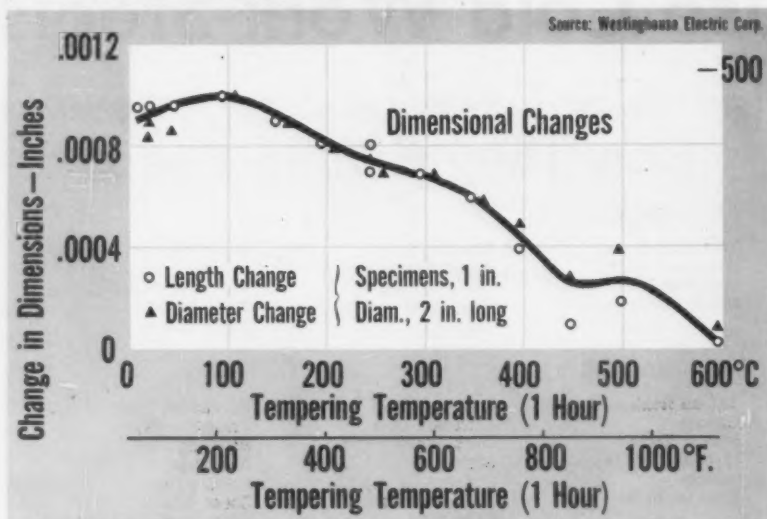
**High Tensile** — A number of these alloys are unusually strong. Tempered to a hardness of Rc 50, their tensile strength exceeds 250,000 psi and their elongation does not fall below 5 pct. They can be annealed between 1350° and 1600°F, depending upon alloy content. In many cases, they exhibit good hot strength at temperatures of 1000°F and above.

The intermediate alloy grades are forged at about 2000°F. They may crack under the hammer if temperature is allowed to drop much below 1700°F. Although they tend to resist decarburization, care should be exercised to avoid this hazard.

Deep-hardening and tough, some of these alloys may be a little difficult to machine. Certain grades, however, are available with minor alloying additions that render them free-machining. These are primarily intended for applications where

# What About Size Changes?

(Air Hardening Die Steel)



mass production machining is involved.

The high carbon-high chromium steels usually contain a minimum of 12 pct Cr. Carbon content may

range from 1.00 to 2.25 pct. Normally, these alloys also contain vanadium, molybdenum, and cobalt. They are generally air hardening, although oil hardening

is optional in some cases (especially grades containing molybdenum).

**Resist Wear**—Basically, the combination of high chromium and carbon produces hard chromium carbides that resist wear. These same carbides tend to detract from ductility and shock resistance. That is why most "D" steels are recommended for applications where shock is absent. This does not affect their usefulness in many die applications where compressive force and wear are major factors.

Also, by adjusting carbon content and by adding carbide-forming elements, it is possible to improve toughness at only a slight sacrifice in wear resistance. A substantial addition of vanadium, for example, will result in grain refinement, greater toughness, and improved fatigue strength.

Most of these alloys are forged at temperatures close to 2000°F. Austenitizing temperatures will vary from 1700° to about 1900°F.

■ How to Get More for Your Tool Steels Dollar

Section 4

## Hot Work Steels for Tools And Structural

**Hot work steels are not only strong—they retain their strength at elevated temperatures.**

**Their unusual properties can be applied equally to missile casings, special machine parts, or hot working dies.**

■ In addition to their normal uses, hot work tool steels have been gaining increasing attention as potential missile and rocket materials. Re-

cently, a vanadium-containing H-11 tool steel (Vascojet 1000) was successfully deep drawn to form a missile casing. This is a rather spectacular development in terms of both fabricating technique and the future potential of tool steels.

**Wide Choice**—The versatility of hot work tool steels is well known. From the standpoint of chemical analysis, they cover a broad range of metallurgical possibilities. This is reflected in an equally broad range

of available mechanical and high-temperature properties.

Although the AISI has classified these steels by a numbering system that starts with H-11 and ends (many alloys later) with H-43, their chemistry is too broad for ready simplification. One tool steel producer subdivides the entire family into three major groups: chromium, chromium-tungsten, and tungsten hot work steels. Other producers have devised their own special classification, based primarily on the



predominance of one or more alloying elements.

**Basic Factors**—All of these steels have at least two things in common. Their carbon contents stay within a medium range (0.35-0.65 pct), and they depend on chromium content (from 2 to 12 pct) for the development of some of their properties. In addition to tungsten, other important alloying elements found in some of these steels include vanadium, molybdenum, and nickel.

A steel such as the H-11 type is a 5 pct Cr alloy with relatively small additions of vanadium and molybdenum. The H-14 grades contain about equal amounts (5 pct) of chromium and tungsten. Greater quantities (7 pct) of both alloying elements form the basis of the H-16 types. All of these alloys, however, are considered chromium-base grades.

Tungsten-base, hot work steels contain from 9 to 18 pct of this element. Their chromium content is correspondingly lowered, usually not exceeding about 4 pct. The H-23 grades are in exception to this rule, containing about 12 pct of both elements. There are also a few molybdenum-base alloys (about 8 pct Mo, maximum) that have relatively high chromium contents (about 4 pct).

This range of alloys covers such requirements as hot hardness, resistance to tempering, high strength over a range of temperatures, toughness and resistance to heat checking, good fatigue and properties, and appreciable wear resistance.

Variation of carbon content in these steels serves an important purpose. In general, lowering carbon content tends to improve toughness. An increase in carbon content, on the other hand, will improve wear resistance with some sacrifice in toughness.

**Preheat to Forge**—Forging temperatures for these steels may run as high as 2150°F. Most important, they should be carefully preheated, brought up to forging temperature at a slow and uniform rate. When forg-

ing temperature is reached, they should be forged as soon as possible. Holding these steels at high heat promotes harmful grain growth and increases the possibility of excessive decarburization.

Both annealing and hardening should be done in protective atmosphere or other suitable media. In many cases, heating for hardening should be a two-stage operation. First, a preheat to a temperature in the range of 1500° to 1550°F is recommended. At this point, the work is transferred to a high heat

furnace. For some alloys, the austenitizing temperature may run as high as 2200°-2300°F.

Depending upon the specific alloy, quenching may be accomplished in oil or salt-pot quenching is preferred. Drastic quenching is not needed to achieve full hardness.

Tempering must follow immediately after hardening. Where an excess of retained austenite interferes with the attainment of full hardness, sub-zero freezing is sometimes recommended. Freezing must be followed by tempering.

## Creep Properties of H11-Type

| VASCO JET 1000     |                             |                                       |         |         |          |            |
|--------------------|-----------------------------|---------------------------------------|---------|---------|----------|------------|
| Temperature<br>°F. | Initial<br>Strength,<br>psi | Max. Stress (psi) for Rupture Life of |         |         |          |            |
|                    |                             | 0.5 hr.                               | 10 hr.  | 100 hr. | 1000 hr. | 10,000 hr. |
| 900                | 290,000                     | 221,000                               | 195,000 | 180,000 | *        | *          |
| 800                | 290,000                     | 235,000                               | 211,000 | 205,000 | 200,000  | 184,000    |
| 700                | 290,000                     | 258,000                               | 220,000 | 215,000 | 210,000  | 203,000    |
| 950                | 260,000                     | 194,000                               | 145,000 | 125,000 | *        | *          |
| 900                | 260,000                     | *                                     | *       | *       | *        | *          |
| 800                | 260,000                     | 219,000                               | 202,000 | 180,000 | 160,000  | 142,000    |
| 1000               | 220,000                     | *                                     | 100,000 | 80,000  | *        | *          |
| 900                | 220,000                     | 185,000                               | 152,000 | 125,000 | 100,000  | *          |
| 800                | 220,000                     | 200,000                               | 200,000 | 185,000 | 173,000  | 163,000    |
| 1000               | 175,000                     | 95,000                                | 82,000  | 55,000  | 37,000   | *          |
| 900                | 175,000                     | *                                     | 104,000 | 84,000  | 68,000   | 55,000     |
| 800                | 175,000                     | *                                     | 108,000 | 100,000 | 83,000   | 66,000     |

Courtesy Vanadium-Alloys Steel Co.

## Some Typical Applications

### HOT WORK STEELS, CHROMIUM BASE

Die Casting Dies  
Punches  
Piercing Tools

Forging Dies  
Extrusion Dies  
Hot Heading Dies

Inserts  
Mandrels  
Blanking Dies  
Dummy Blocks

### CHROMIUM - TUNGSTEN

Hot Blanking Dies  
Bulldozing Dies  
Coining Dies  
Extrusion Dies  
Hot Punches

Forming Dies  
Gripper Dies  
Hot Drawing Dies and  
Inserts  
Hot Heading Tools

Hot Shear Blades  
Nut Dies  
Nut Piercers  
Trimmer Dies

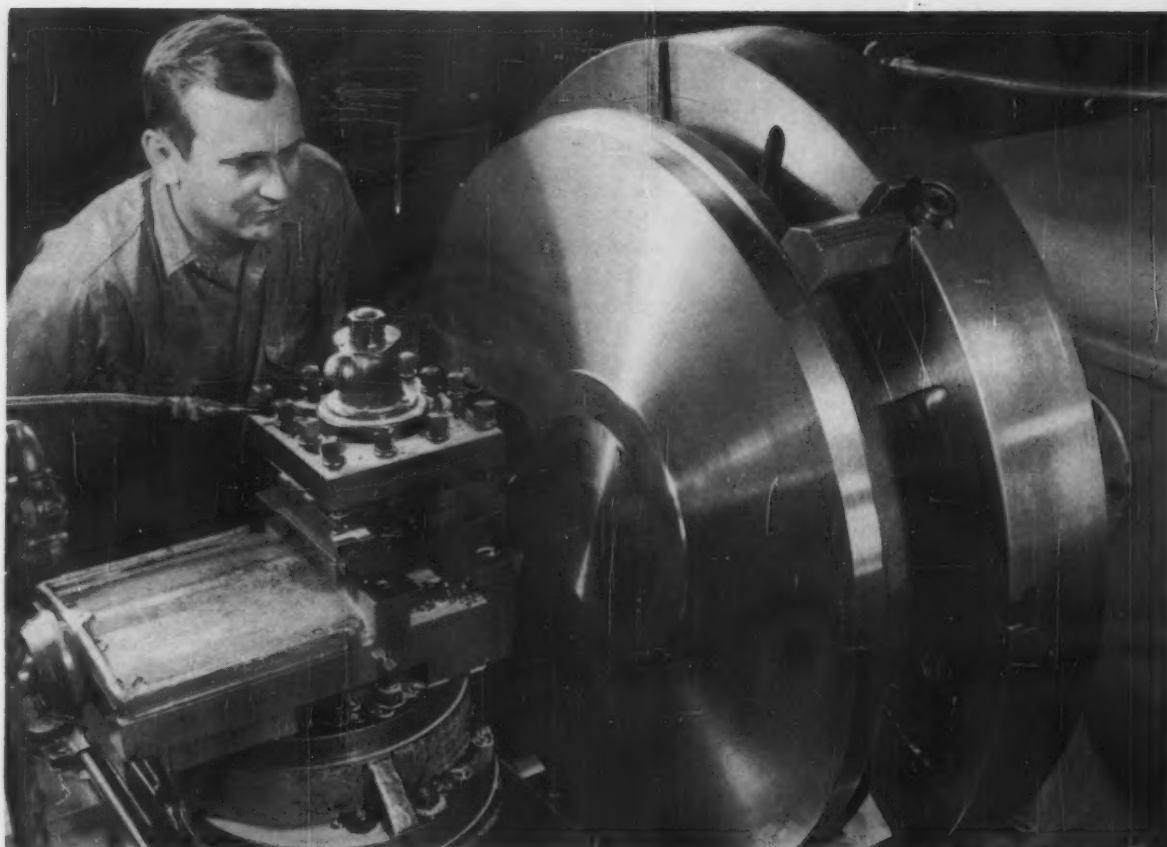
### TUNGSTEN BASE

Mandrels  
Hot Blanking Dies  
Shell Forming Tools  
Brass Forging Dies  
Compression Dies  
Flying Shear Blades

Hot Punches  
Hot Trimming Dies  
Bulldozing Tools  
Brass Extrusion Dies  
Piercer Points  
Extrusion Liners

Gripper Dies  
Hot Swaging Dies  
Hot Cut-Offs  
Brass Die Casting Dies  
Hydraulic Forging Dies  
Nut Piercers  
Rotary Shear Blades

Courtesy Universal-Cylaps Steel Corp.



Courtesy Allegheny Ludlum Steel Corp.

**BACK-UP BLOCK:** Used to support an extrusion die, this tool steel block is subjected to rugged pounding.

■ How to Get More for Your Tool Steels Dollar | Section 5

## High Speed Tool Steels— Tailored For Machining

**Most of these steels are rich in alloy to withstand the wear and tear of grueling metal-cutting operations.**

**Here are helpful pointers on both molybdenum and tungsten-base grades.**

■ Some tool steels are exceptionally good at cutting and machining steels and other metals. They are capable of machining at high speeds. And it was primarily from

just such applications that high speed tool steels derived their name. It is certainly not true, however, that high speed steels are used for cutting tools exclusively, even though this is one of their principal functions.

These highly alloyed steels are usually of the tungsten base or molybdenum base types, depending upon which of these elements predominates in the chemistry of the material. Chromium, vanadium, cobalt, and columbium are also added

to many of these steels to improve wear resistance, refine grain structure, and benefit response to heat treatment.

**High In Alloy**—All of the tungsten base alloys classified by AISI contain about 4 pct chromium. Their carbon contents range from a low of 0.70 pct to a high of 1.50 pct. Vanadium and cobalt are listed as major secondary alloying elements. Tungsten content may run as high as 20 pct.

Most of the molybdenum base alloys contain some tungsten, ranging from 1.50 to about 6.50 pct. Their carbon and chromium contents are comparable to the tungsten base alloys. Almost all of them contain some vanadium.

Crucible Steel Co. observes that "when molybdenum is used in place of tungsten, the amount of molybdenum is about one-half the amount of tungsten replaced. Chromium, in conjunction with tungsten or molybdenum, improves red hardness. It also adds wear resistance by forming chromium carbides. With cobalt added, or vanadium increased, further classification of types is necessary. Cobalt, while it does not form carbides, further increases red hardness. Vanadium produces a hard carbide which is extremely abrasion resistant."

**Tungsten Base**—The tungsten base steels bear the AISI designation letter "T." With their high alloy content, they must be heated slowly and uniformly for forging. While a general range of forging temperatures for each major type has been published by AISI, it is still advisable to determine the producer's recommendations for each specific alloy. Minimum allowable forging temperature must be strictly adhered to.

After hot working, high speed steels must be fully annealed. Adequate protection against scaling and decarburization must be provided. This may take the form of a protective atmosphere, an inert packing material, or a charcoal and ashes mixture. (Too much charcoal may promote carbon pick-up, thus altering mechanical properties to some extent.)

**After Machining**—When these materials have been machined, a stress relieving treatment must precede final hardening. The subcritical annealing temperature is almost always recommended for stress relieving.

Hardening must begin with preheating, long soaking times should be avoided. Parts of intricate design

or with thin cutting edges often require a double preheat. The second preheat temperature is normally at least 50°F higher than the first.

After austenitizing, these steels may be quenched in warm oil, an air blast, or still air. Tempering should follow immediately. It may be handled in either a suitable furnace or salt bath.

"Selection of a tempering temperature," according to Universal-Cyclops, "is dependent upon the application of the tool and upon the hardening temperature employed. Tools which have been subjected to high hardening temperatures will require higher tempering temperatures to develop maximum

secondary hardness than tools which have been hardened at lower temperatures. Tools that are required to have a hardness of Rc 65-66 should be tempered differently than those requiring hardnesses of Rc 61-62."

**Secondary Hardening**—In general, the heat treatment of molybdenum base steels is comparable in most respects to that afforded tungsten base alloys. The same basic precautions must be followed. Tempering must reflect secondary hardening requirements. The molybdenum base steels have more of a tendency to decarburize, however. In general, their heat treatment requires more care.

## High Speed Steel Applications

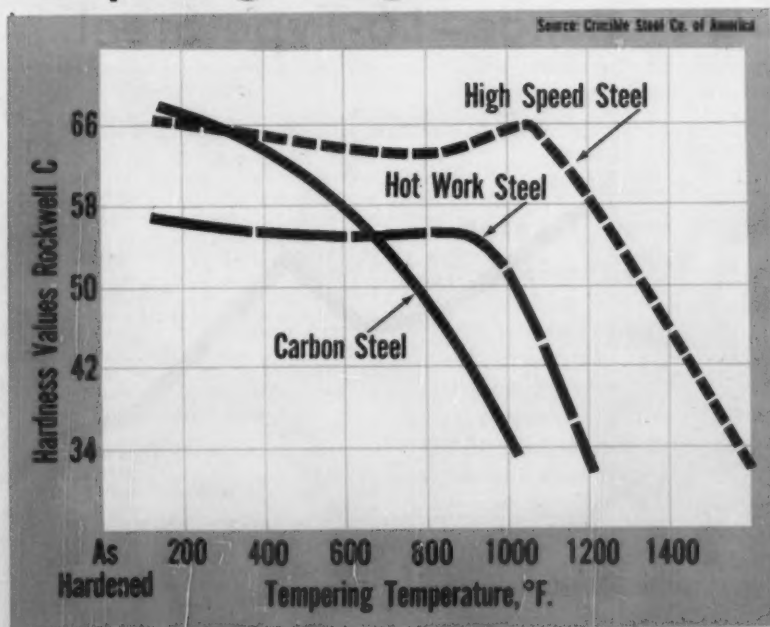
Blanking Punches  
Blanking Dies  
Boring Tools  
Broaches  
Burnishing Tools  
Counter Sinks  
Counter Bore  
Cutting-off Tools  
Extrusion Dies  
File Cutting Chisels

Form Cutters  
Gear Cutters  
Hobs  
Inserted Saw Teeth  
Lathe Centers  
Lathe Tools  
Milling Cutter Teeth  
Milling Cutters  
Paper Knives  
Planer Tools

Reamers  
Reamer Blades  
Roll Turning Tools  
Shear Blades  
Slotting Cutters  
Taps and Dies  
Thread Chasers  
Tire Turning Tools  
Twist Drills  
Wood Cutting Knives

Courtesy Latrobe Steel Co.

## Tempering Ranges





# Special Purpose Tool Steels

**Last—but not least, these grades include important mold steels and nickel-containing alloys.**

Special purpose tool steels are mostly low alloy grades and have been classified under four headings. The low alloy types (L) usually contain no more alloy than is contained in 4100 or 4300 series steels. Their carbon content, however, runs to the high side and will sometimes exceed 1 pct. Their principal alloying element is usually chromium.

F-type steels contain tungsten up to about 3.5 pct and are high in carbon. Mold steels (P) are very low in carbon (0.07-0.10 pct) and frequently contain more chromium than the low alloy types. Some mold steels also contain nickel for added toughness. A fourth group of special purpose steels is a "catch-all," covering any miscellaneous grades that fall outside the three primary special purpose steel groups.

Among low alloy types, those containing 1 pct or more of nickel are of particular interest. Oil hardening, these steels combine unusual toughness with excellent wear resistance. Their tendency toward warpage and deformation is surprisingly low. Essentially, these grades offer many of the advantages of higher alloy at a lower cost.

The dimensional stability of nickel-containing grades can be seen in an accompanying chart. The data apply to an L-6 type steel produced by the Carpenter Steel Co. Its nickel content is slightly higher than average (1.75 pct).

This particular alloy "may be expected to expand about 0.0017 in. when quenched, and upon drawing to 300° to 400°F, it should return within 0.001 in. of its original size. Heavier sizes will have less tendency to expand."

According to the producer, this steel is being used for a variety of machinery parts such as pawls, knuckle pins, spindles, clutch pins,

and dogs. It is also ideal for hubs, collets, blanking and forming dies, stamps, punches, and shear blades.

The usual range of forging temperatures recommended for "L" steels is 1800° to 2000°F. They must not be forged at temperatures below about 1550°F. They are normalized in the range of 1600° to 1650°F.

Providing a medium depth of hardening, all of these steels can be oil quenched and a few may be quenched in water. When a choice of the two quenching media is allowed, oil quenching is preferred where warpage or deformation is a problem. Depending upon part geometry, water quenching may result in cracking.

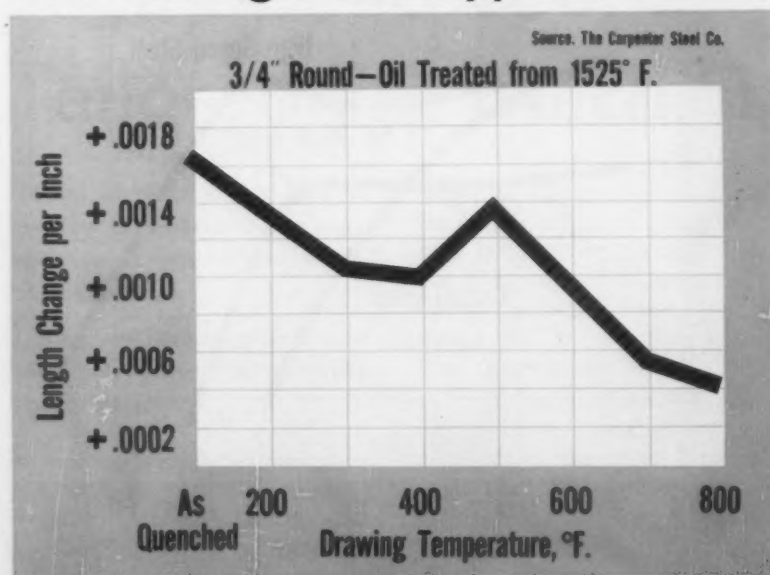
All of these steels are fairly easy to machine, exhibit good wear resistance and are not highly susceptible to decarburization.

Mold steels (P-types) are special low carbon alloys that are suited for carburizing. In the carburized condition, they develop a high surface hardness and an exceptionally tough, shock-resistant core. In addition to high surface hardness, carburizing also contributes to good wear resistance.

Depending upon alloy content, the machinability of these steels varies from poor to good. This is an important factor in selection, especially where intricate mold machining is involved.

**ACKNOWLEDGMENT:** The editors want to thank the many production experts and metallurgists whose assistance helped make this feature possible. They especially want to acknowledge the generous assistance of members of the Committee of Tool Steel Producers, American Iron and Steel Institute.

## Size Change—L6-Type Steel



# Comparable Tool Steel Brands

## Cross Index of Brands That Carry AISI Type Designations

### Water Hardening Steels

#### W1

11 Comet ..... Carpenter  
 11 Extra ..... Carpenter  
 11 Special ..... Carpenter  
 A. S. Blue Label ..... Ackerlind  
 A. S. V. .... Firth Sterling  
 Achorn Best Carbon ..... Achorn  
 Achorn Cold Heading ..... Achorn  
 Achorn Extra Blade ..... Achorn  
 Achorn Extra Carbon ..... Achorn  
 Achorn Extra Chisel ..... Achorn  
 Achorn Hollow Drill ..... Achorn  
 Achorn Solid Drill ..... Achorn  
 Achorn Standard ..... Achorn  
 Apex Drill Rods ..... Lehigh  
 Atlantic Standard ..... Atlantic  
 Atlas Alpha-8 ..... Atlas  
 Atlas Refined-8 ..... Atlas  
 Atlas Refined-10 ..... Atlas  
 Atlas X-10 ..... Atlas  
 Atlas X-12 ..... Atlas  
 Atlas XX-95 ..... Atlas  
 Atsco ..... Atlantic  
 Atsco Extra ..... Atlantic  
 Autodie ..... Columbia  
 Best ..... Firth Sterling  
 Best Carbon ..... Boyd-Wagner  
 Black-Diamond ..... Crucible Steel  
 C. H. Q. .... Firth Sterling  
 Carbon ..... Faltoute  
 Carbon Drill Rod ..... Universal-Cyclops  
 Colonial No. 14 ..... Vanadium-Alloys  
 Columbia Electrex ..... Columbia  
 Columbia Extra ..... Columbia  
 Columbia Extra  
     Headerdie ..... Columbia  
 Columbia Special ..... Columbia  
 Columbia Standard ..... Columbia  
 Commando Drill Rod ..... Atlas  
 Conqueror ..... Lehigh  
 Conqueror Hollow ..... Lehigh  
 Crescent Special ..... Crucible Steel  
 Darwin Special ..... Darwin & Milner  
 Darwin Standard ..... Darwin & Milner  
 Delaware Extra ..... Delaware  
 Delaware Standard ..... Delaware  
 Carbon ..... Faltoute  
 Diamond "E" Drill Rod ..... Edgecomb  
 Dukane Drill Rod ..... Pittsburgh  
 Duplex ..... Faltoute  
 ES 6 ..... Marathon Specialty  
 Extra ..... Faltoute, Firth Sterling,  
     Kloster and Republic  
 Extra L ..... Vanadium-Alloys  
 GW Extra ..... Great Western  
 GW Regular ..... Great Western  
 GW Special ..... Great Western  
 Gibraltar ..... H. Baker  
 Granada ..... Crucible Steel  
 Green Label Drill Rod ..... Carpenter  
 H-9 Double Header ..... Carpenter  
 H & R Carbon ..... Houghton & Richards  
 H & R Heading Die  
     Houghton & Richards  
 H. S. C. Regular ..... Hoyland  
 H. S. C. Special ..... Hoyland  
 H. S. C. Cold Header Die ..... Hoyland

H. S. C. SS Extra ..... Hoyland  
 Hawk Brand ..... Hawkridge  
 Hawk Cold Header Die ..... Hawkridge  
 Hawk Standard ..... Hawkridge  
 Jamison Special ..... Jamison  
 LaBelle Cold Striking ..... Crucible Steel  
 LaBelle Extra ..... Crucible Steel  
 Lion ..... Jessop  
 Lion Extra ..... Jessop  
 Macco Broaching and  
     Channeller ..... McDonald  
 Macco Extra ..... McDonald  
 Macco Solid ..... McDonald  
 Macco Special W. H. .... McDonald  
 Macco Standard ..... McDonald  
 Maple Leaf ..... Atlas  
 Monaca Drill Rod ..... Pittsburgh  
 NonAnnealed Standard ..... Coulter  
 NonExcelled Extra Carbon ..... Coulter  
 Orange Label ..... Milne  
 P-B Drill Rod ..... Patriarche & Bell  
 Pompton ..... Allegheny-Ludlum  
 Quality Carbon Drill ..... Latrobe  
 Red Label ..... Milne  
 Red Star Tool ..... Vanadium-Alloys  
 Regular ..... Ziv  
 Reliance Drill Rod ..... Pittsburgh  
 SS 2 ..... Marathon Specialty  
 SSC ..... Darwin & Milner  
 Sanderson Extra ..... Crucible Steel  
 Silver Die 1 ..... Firth Sterling  
 Silver Die 2 ..... Firth Sterling  
 Simonds Blue Label Extra ..... Simonds  
 Simonds Diamond "S"  
     Standard ..... Simonds  
 Simonds Green Label ..... Simonds  
 Simonds Red Label Special ..... Simonds  
 Special ..... Braeburn, Faltoute, Firth  
     Sterling, Kloster, Republic  
     and Universal-Cyclops  
 Special A. S. V. .... Firth Sterling  
 Special, Extra & Standard  
     Carbon ..... Latrobe  
 Special XX ..... Firth Sterling  
 Standard ..... Kloster, Latrobe, Re-  
     public, Universal-Cyclops  
 Sterling ..... Firth Sterling  
 Sterling XX ..... Firth Sterling  
 Tool Grade ..... Republic  
 UHB ..... Uddeholm  
 UHB Extra ..... Uddeholm  
 Utility ..... Lehigh  
 Victor Drill Rod ..... Crucible Steel  
 Vulcan Ajax Drill Rod ..... Vulcan-Kidd  
 Vulcan Extra ..... Vulcan-Kidd  
 Vulcan Fort Pitt ..... Vulcan-Kidd  
 Vulcan Special ..... Vulcan-Kidd  
 Vulcan Striking Die ..... Vulcan-Kidd  
 Vulcan Tru-Cor Drill Rod  
     Vulcan-Kidd  
 Washington ..... Jessop  
 WATERerat ..... Marshall  
 White Label ..... Swedish-American and  
     Milne  
 Wm. Jessop Yellow Label ..... Ackerlind  
 XCL ..... Bethlehem  
 X ..... Bethlehem  
 XX ..... Bethlehem  
 XXX ..... Bethlehem  
 Zivco ..... Ziv

#### W2

11 Extra-Vanadium ..... Carpenter  
 11 Special-Vanadium ..... Carpenter  
 A. S. White Label ..... Ackerlind  
 Alva Extra ..... Crucible Steel  
 Atlas Special Alloy-8 ..... Atlas  
 Atlas Special Alloy-10 ..... Atlas  
 Atsco Special ..... Atlantic  
 Best and Superior ..... Bethlehem  
 Blue Label ..... Peninsular  
 Champion Econo #1-V ..... Champion  
 Colonial No. 7 ..... Vanadium-Alloys  
 Dumost 2 ..... Republic  
 Dumost 3 ..... Republic  
 Draco Special ..... Universal-Cyclops  
 Draco Standard ..... Universal-Cyclops  
 Elvandi ..... Vanadium-Alloys  
 Extra ..... Ziv  
 Extra V ..... Firth Sterling  
 GW Cold Header ..... Great Western  
 Grade "A" ..... Diehl  
 Granada Vanadium ..... Crucible  
 H & R Vanadium  
     Houghton & Richards  
 Hawk Vanadium ..... Hawkridge  
 KSS ..... Marathon Specialty  
 Lion Extra-Vanadium ..... Jessop  
 Lion Vanadium ..... Jessop  
 Macco B-29 W. H. .... McDonald  
 New Process Cold Header Va. .... Jessop  
 Nitro ..... Carpenter  
 Python ..... Allegheny Ludlum  
 Red Star Vanadium Vanadium-Alloys  
 SS 5 ..... Marathon Specialty  
 Silvan Star ..... Firth Sterling  
 Simonds Blue Label Extra ..... Simonds  
 Simonds Diamond "S" Standard  
     Simonds  
 Simonds Green Label ..... Simonds  
 Simonds Red Label Special ..... Simonds  
 Special ..... Ziv  
 Special Draco ..... Universal-Cyclops  
 Special V  
     Braeburn and Firth Sterling  
 Sterling V ..... Firth Sterling  
 UHB-19 VA ..... Uddeholm

### A Note on These Tables

The tool steel brands listed here are those which have been classified by the producer or distributor under American Iron and Steel Institute symbols. While a majority of U. S. tool steels can now be identified by these symbols there are still some well known—and some new—tool steels which do not fall into AISI chemistries and so can not be classified in these tables. For key to producers please see last page of this section.—The Editors.

**UHB-VA** ..... Uddeholm  
**V. D. Tool Steel** ..... Ryerson  
**Vanadium Autodie** ..... Columbia  
**Vanadium Electrex** ..... Columbia  
**Vanadium Extra** ..... Columbia  
**Vanadium Standard** ..... Columbia  
**Vulcan Special** ..... Vulcan-Kidd  
**Vulcan Vanadium Striking Die**  
    Vulcan-Kidd  
**Washington Special** ..... Jessop

**W3**

**Colhed** ..... Vanadium-Alloys  
**Draco DV** ..... Universal-Cyclops  
**KSS Supra** ..... Marathon Specialty  
**SS 3** ..... Marathon Specialty

**W4**

**ECR** ..... Marathon Specialty  
**Sanderson Special** ..... Crucible Steel  
**Silver Star** ..... Firth Sterling  
**Sterling M** ..... Firth Sterling  
**Very Best** ..... Boyd-Wagner

**W5**

**27S** ..... Universal-Cyclops  
**Atlas "Q"** ..... Atlas  
**Beacon** ..... Edgcomb  
**Starrett Precision Ground Die Stock**  
    Starrett  
**Vulcan K. R.** ..... Vulcan-Kidd  
**Waterdie Extra** ..... Columbia  
**Waterdie Standard** ..... Columbia

**W7**

**H & R Piston** ..... Houghton & Richards  
**Hercules** ..... Universal-Cyclops

**Shock Resisting Steels****S1**

**67 Chisel** ..... Bethlehem  
**A. S. No. 7** ..... Ackerlind  
**Achorn U. B. C.** ..... Achorn  
**Alco M** ..... Universal-Cyclops  
**Alco S** ..... Universal-Cyclops  
**AO 20** ..... Milne  
**Atha Pneu** ..... Crucible Steel  
**Boker Power Chisel** ..... H. Boker  
**Brown Label** ..... Peninsular  
**Bulldog** ..... Pennsylvania  
**Buster Alloy 50** ..... Columbia  
**Buster Alloy 60** ..... Columbia  
**C-V** ..... Republic  
**Chiz-Alloy** ..... Kloster  
**Durax** ..... Marathon Specialty  
**Falcon-4** ..... Atlas  
**Falcon-6** ..... Atlas  
**GW 422 Mirycal** ..... Great Western  
**H & R 225** ..... Houghton & Richards  
**H. S. C. 422** ..... Hoyland  
**Hickory No. 7** ..... Jamison  
**Ideor** ..... Darwin & Milner  
**J. S. Punch** ..... Firth Sterling  
**Macco Foolproof** ..... McDonald  
**Macco Foolproof O. H.** ..... McDonald  
**NonShock Tungsten** ..... Coulter  
**PW 2** ..... Marathon Specialty  
**Par-Exc** ..... Vanadium-Alloys  
**Seminole** ..... Allegheny Ludlum  
**Seminole Hard** ..... Allegheny Ludlum  
**Seminole Medium** ..... Allegheny Ludlum  
**Simonds Commando 47** ..... Simonds  
**Special 18** ..... Boyd-Wagner  
**Super Alloy** ..... Kloster  
**Top Notch** ..... Jessop  
**Tuncro** ..... Atlantic  
**UHB-711** ..... Uddeholm  
**Vibro** ..... Braeburn Alloy

**Vulcan Q. A.** ..... Vulcan-Kidd  
**Wm. Jessop J-4** ..... Ackerlind  
**Wizard** ..... Ziv  
**XL Chisel Alloy Tool** ..... Latrobe

**S2**

**Delaware S.T.** ..... Delaware Tool  
**H & R Silico** ..... Houghton & Richards  
**Monark-1** ..... Atlas  
**Simonds Havoc** ..... Simonds  
**Solar** ..... Carpenter  
**Triton** ..... Braeburn Alloy  
**Venango** ..... Universal-Cyclops

**S3**

**M-Tungsten** ..... Republic  
**Vulcan Blue Edge** ..... Vulcan-Kidd

**S4**

**67** ..... Universal-Cyclops  
**71 Alloy** ..... Bethlehem  
**H & R 8M** ..... Houghton & Richards  
**La Belle 2-70** ..... Crucible Steel  
**Macco Sil. Mang. OH** ..... McDonald  
**SA** ..... Marathon Specialty  
**Silman** ..... Vanadium-Alloys  
**Special Punch** ..... Republic  
**Vulcan 4870** ..... Vulcan-Kidd

**S5**

**67** ..... Universal-Cyclops  
**259** ..... Jessop  
**481** ..... Carpenter  
**AL 609** ..... Allegheny-Ludlum  
**Alloy 10** ..... Braeburn Alloy  
**Atsil** ..... Atlantic  
**BTF Alloy** ..... Bedford  
**Bedco Alloy** ..... Bedford  
**C. E. C. Smoothcut** ..... Columbia  
**Champion 255** ..... Champion  
**Chimo** ..... Firth Sterling  
**Darwin Extra Tough**  
    Darwin & Milner

**Delsteel Alloy** ..... Delaware  
**Duredge** ..... Boyd-Wagner  
**GW 280 Tukfut** ..... Great Western  
**H & R 8** ..... Houghton & Richards  
**H. S. C. 280** ..... Hoyland  
**Hy-Ten Pneumatic Chisel**  
    Wheelock, Lovejoy

**LaBelle Silicon No. 2** ..... Crucible Steel  
**M S M** ..... Milne  
**Macco Hard Tuf O. H.** ..... McDonald  
**Magic** ..... Jessop  
**Monark-2** ..... Atlas  
**Mosil** ..... Vanadium-Alloys  
**NonSpall Punch and Chisel** ..... Coulter  
**Omega** ..... Bethlehem  
**Plancher** ..... Agawam  
**Rocket** ..... Lehigh  
**Shearcut** ..... Pennsylvania  
**Shock-Rite** ..... St. Lawrence  
**Silver Label** ..... Peninsular  
**Simonds Orleans** ..... Simonds  
**Tamco Tool Steel**

**The Tool & Mfg. Co.**  
**UHB Resisto** ..... Uddeholm  
**V-76** ..... Kloster

**Cold Work Steels****Oil Hardening****O1**

**A. S. Green Label** ..... Ackerlind  
**Achorn Superior Oil hardening**  
    Achorn  
**Amcoh** ..... Milne  
**Arrow Non Shrinkable** ..... Boyd-Wagner  
**Atlan** ..... Atlantic  
**BTR** ..... Bethlehem

**Badger** ..... Latrobe  
**Carpenter O-1** ..... Carpenter  
**Choyce 77** ..... Champion  
**Colonial No. 6** ..... Vanadium-Alloys  
**Crest O.H.** ..... St. Lawrence  
**DoAll Precision Ground Tool & Die**  
    DoAll  
**Exl-Die** ..... Columbia  
**GW "CW Oil"** ..... Great Western  
**H & R Tungsten OH**  
    Houghton & Richards

**H. S. C. CW Oil** ..... Hoyland  
**Hargus** ..... Agawam  
**Invaro 1** ..... Firth Sterling  
**K-46 O.H.** ..... Jamison  
**Keewatin** ..... Atlas  
**Ketos** ..... Crucible Steel  
**Kiski** ..... Braeburn Alloy  
**Kloster Swed-Oil** ..... Kloster  
**Macco Royal Crown, O.H.** ..... McDonald  
**Meridian Die "O", Steels** ..... Meridian  
**Microloy Ground Flat Stock**  
    Capewell

**NonDistort O. H.** ..... Coulter  
**Non-Pa-Reil** ..... Swedish-American  
**Non-Shrinkable** ..... Vanadium-Alloys  
**OHT** ..... Darwin & Milner  
**Oilhard** ..... Faltoute  
**Oil Hardening** ..... DoAll  
**Oilcrat** ..... Marshall Steel  
**Oilway** ..... H. Boker  
**Saratoga** ..... Allegheny-Ludlum  
**Simonds Teenax 46** ..... Simonds  
**Special Oil Hardening** ..... Jessop  
**Starrett Precision Ground Die Stock**  
    Starrett

**Swed-Oil** ..... Kloster  
**Tempo** ..... Pennsylvania  
**Tensiloy Oil Hardening**

**Die** ..... Allied Steel  
**Torpedo** ..... Lehigh  
**Truform** ..... Jessop  
**UHB-46** ..... Uddeholm  
**Utex** ..... Diehl  
**Veresta V** ..... Marathon Specialty  
**Veribest** ..... Diehl  
**Vulcan Keystone Drill**  
    Rod  
**Vulcan Oil-Hard** ..... Vulcan-Kidd  
**Wando** ..... Universal-Cyclops  
**Warplis Drill Rod Round** ..... Pittsburgh  
**Warplis Ground Flat**  
    Stock  
**Wm. Jessop Superior** ..... Ackerlind  
**Yellow Label** ..... Peninsular

**O2**

**Arrestite** ..... Republic  
**Deward** ..... Allegheny Ludlum  
**GM O, Die** ..... Columbia  
**H Brand** ..... Darwin & Milner  
**H & R 19** ..... Houghton & Richards  
**H & R Oil Hardening** ..... H & R  
**Invaro 2** ..... Firth Sterling  
**Mangano Oil Hardening** ..... Latrobe  
**Ry-Alloy** ..... Ryerson  
**S. O. D.** ..... Braeburn Alloy  
**Simonds Red Streak, Flat** ..... Simonds  
**Special Oil Hardening** ..... Republic  
**Special Oilway** ..... H. Baker  
**Stentor** ..... Carpenter  
**Vulcan Non Shrinkable** ..... Vulcan-Kidd

**O6**

**Dargraph** ..... Darwin & Milner  
**Graph-Mo** ..... Timken  
**Lubri-Die** ..... Ziv  
**Oilgraph** ..... Allegheny Ludlum

**O7**

**67 Tap** ..... Bethlehem  
**H & R 60** ..... Houghton & Richards  
**Para** ..... Universal-Cyclops



Red Star Tungsten..Vanadium-Alloys  
Utica .....Allegheny Ludlum  
Vulcan Hardrite .....Vulcan-Kidd

## Medium Alloy, A.H.

### A2

484 .....Carpenter  
A-H5 .....Bethlehem  
A. S. No. 5 .....Ackerlind  
Achorn C V M .....Achorn  
AIRcrat .....Marshall  
Air-Chrom .....Kloster  
Air Hard .....Vanadium-Alloys  
Air Hardening .....DoAll  
Airkool .....Crucible Steel  
Airque .....Braeburn Alloy  
Airtem .....Lehigh  
Airtreat A. H. ....Jamison  
Airvan .....Firth Sterling  
Bora 5 .....Marathon Specialty  
Boko-5-Chrome Die Steel..H. Boker  
Crest A.H. ....St. Lawrence  
Cro-mo-loy .....Atlas  
Delair .....Delaware  
DoAll Precision Ground .....DoAll  
Dumore .....Ziv  
E-Z-Die Smoothcut .....Columbia  
Econo 5 .....Champion  
GW "CVM" .....Great Western  
H & R 80 .....Houghton & Richards  
H. S. C. CVM .....Hoyland  
Hardnair .....Atlantic  
Hi-Di 5 Non-Shrinking..Boyd-Wagner  
Hy-Ten A2-A. H. ....Wheelock, Lovejoy  
Kromair .....Republic  
Krovan .....Diehl  
Macco 35 A. H. ....McDonald  
Meridian Die Steels .....Meridian  
Milnair 5 .....Milne  
Mineor .....Darwin & Milner  
NonChange A. H. ....Coulter  
Penair 5 .....Peninsular  
Penn-Air .....Pennsylvania  
Pittsburgh A. H. Ground  
Flat Stock .....Pittsburgh  
Sagamore .....Allegheny Ludlum  
Sagamore EZ .....Allegheny Ludlum  
Select B FM .....Latrobe  
Simonds Airtrue 51 .....Simonds  
Simonds Red Streak Flat .....Simonds  
Sparta .....Universal-Cyclops  
Starrett Precision Ground  
Die Stock A. H. ....Starrett  
UHB-151 .....Uddeholm  
Vulcan Vuldie .....Vulcan-Kidd  
Vulcan Vuldie F. M. ....Vulcan-Kidd  
Windsor .....Windsor

### A4

Air-4 .....Bethlehem  
Airaloy .....Republic  
Airmo .....Firth Sterling  
Vulcan Vairloy .....Vulcan-Kidd  
Vega .....Carpenter

## High Carbon—High Chromium

### D1

Bora .....Marathon Specialty  
H & R. K-2L. ....Houghton & Richards  
Lehigh-L .....Bethlehem

### D2

404 .....Republic  
610 .....Carpenter  
A. S. Tri-Ack .....Ackerlind  
Achorn High Production .....Achorn  
Airdi 150 .....Crucible Steel  
Atlan HCC .....Atlantic  
Atmodie .....Columbia  
Atmodie Smoothcut .....Columbia  
Bora Special M ..Marathon Specialty  
Chromdie .....Faitoute

CNS 1 .....Jessop  
Cromovan .....Firth Sterling  
Darwin 1 .....Darwin & Milner  
Densite AH .....Jamison  
Dycro .....Pennsylvania  
F.C. A.H. Cast-to-Shape  
Allegheny Ludlum

F.C. Roloy Cast-to-Shape  
Allegheny Ludlum

F.N.S. & F.N.S.-fm .....Atlas  
GW 265 High

Production .....Great Western  
Hicro 150 .....Diehl  
High Production .....Milne  
Hi-Run .....Kloster  
H & R K2 .....Houghton & Richards  
H. S. C. 265 .....Hoyland  
Hypro .....Swedish-American  
Hypro 61 A.H. ....Boyd-Wagner  
Hy-Ten D2-A.H. ....Wheelock, Lovejoy  
Kinite .....H. Boker  
Lehigh H .....Bethlehem  
Macco Kromax 1 .....McDonald  
NonAbrade A. H. ....Coulter  
Ohio Die .....Vanadium-Alloys  
Olympic .....Latrobe  
Olympic FM .....Latrobe  
Ontario .....Allegheny Ludlum  
Simonds C. C. M. ....Simonds  
Superior 3 .....Braeburn Alloy  
Tensiloy High C High Cr .....Allied  
Trimo .....Uddeholm  
Trudie .....Champion  
Ultradie 2 .....Universal-Cyclops  
Ultradie 3 .....Universal-Cyclops  
Vulcan Alidie .....Vulcan-Kidd  
Vulcan Alidie F. M. ....Vulcan-Kidd  
Vulcan Croloy .....Vulcan-Kidd  
Vulcan Hi-pro .....Vulcan-Kidd  
White Label .....Peninsular  
Wm. Jessop Alloy "C" .....Ackerlind

### D3

A. S. Vi-Chrome .....Ackerlind  
Atlas NN & NN-fm .....Atlas  
CNS 2 .....Jessop  
Double Six .....Milne  
GSN FM .....Latrobe  
GW 265-H High

Production .....Great Western  
Hampden .....Carpenter  
Hicro 200 .....Diehl  
H & R K .....Houghton & Richards  
H. S. C. 265-H .....Hoyland  
Huron .....Allegheny Ludlum  
Hycro .....Lehigh  
Hypro 62 O.H. ....Boyd-Wagner  
Kapo .....Kloster  
Lehigh S .....Bethlehem  
Neor .....Darwin & Milner  
NonAbrade O. H. ....Coulter  
Simonds 12225 .....Simonds  
Superdie .....Columbia  
Superior 1 .....Braeburn Alloy  
Triple Die .....Firth Sterling  
Trivan .....Uddeholm  
Ultradie 1 .....Universal-Cyclops  
White Label S .....Peninsular

### D4

Crocac .....Vanadium-Alloys  
HYCC .....Crucible Steel  
Ultradie 1M .....Universal-Cyclops

### D5

3-C Special .....Jessop  
Cobalt Chrome FM .....Latrobe  
Cromoco .....Firth Sterling  
Double Seven .....Milne  
EK-81 .....Universal-Cyclops  
F.C. 66 Cast-to-Shape  
Allegheny Ludlum  
H & R 61 .....Houghton & Richards  
Macco Kromax 2 .....McDonald

NonAbrade Cobalt .....Coulter  
PRK-33 .....Darwin & Milner  
Superior 2 .....Braeburn Alloy  
Super Kinite .....H. Boker  
Trudie Special .....Champion

### D6

A. S. Vi-Chrome W .....Ackerlind  
Bora Special .....Marathon Specialty

### D7

BR-4 FM .....Latrobe  
H & R K 3 .....Houghton & Richards  
Tru-Wear F. M. ....Jessop

## Hot Work Steels

### Chromium Base

#### H11

882 .....Carpenter  
Castdie Alloy .....Columbia  
Cromo-V .....Bethlehem  
Dica B Modified .....Jessop  
Dycast 1 .....Latrobe  
E 38 .....Marathon Specialty  
Firedie Heat Resisting ....Columbia  
H & R Hot Work 5  
Houghton & Richards  
H.W.A. ....Darwin & Milner  
H. W. D. 2 .....Firth Sterling  
Halcomb 218 .....Crucible Steel  
Hotford 2 .....Vanadium-Alloys  
NuDie .....Crucible Steel  
Potomac A. ....Allegheny Ludlum  
Pressurdie 3L .....Braeburn Alloy  
Thermold A .....Universal-Cyclops  
Vasco Jet 1000 .....Vanadium-Alloys  
Vulcan Magal .....Vulcan-Kidd

#### H12

10HW .....Republic  
345 .....Carpenter  
A. S. Cromo W V .....Ackerlind  
Achorn AF-33 Hot Work ....Achorn  
Alcodie .....Columbia  
C M W .....Milne  
Champion HW .....Champion  
Chro-Mow .....Crucible Steel  
Cromo-W. Bethlehem & Boyd-Wagner  
Cromo-WV .....Bethlehem  
Cromo-W55 .....Bethlehem  
Crodu .....Atlas  
D-C-33 .....Kloster  
Dica B .....Jessop  
E3 8-V .....Marathon Specialty  
E38W .....Marathon Specialty  
F.C. 5X1 .....Allegheny Ludlum  
Ferno .....Lehigh  
GW 99 Hot Work .....Great Western  
H. P. D. ....Ziv  
H & R Hot Work 6  
Houghton & Richards  
H & R Hot Work 7  
Houghton & Richards

H. S. C. 33 .....Hoyland  
H.W.D. 1 .....Firth Sterling  
H.W.S. ....Darwin & Milner  
Hotform 1 .....Vanadium-Alloys  
Hotform 3 .....Vanadium-Alloys  
L. P. D. ....Latrobe  
Macco ML .....McDonald  
Macco M.L.V. ....McDonald  
NonCheck Forge Die .....Coulter  
P.H.W. ....Pennsylvania  
Penco CR-MO-W .....Peninsular  
Potomac .....Allegheny Ludlum  
Pressurdie 2 .....Braeburn Alloy  
Thermold B .....Universal-Cyclops  
UHB Special .....Uddeholm  
Volcano .....Lehigh  
Vulcan RMK .....Vulcan-Kidd  
Vulcan TCM .....Vulcan-Kidd

W4X ..... Finkl

**H13**

33-V ..... Achorn  
 883 ..... Carpenter  
 A. S. No. 670 Hot Work ..... Ackerlind  
 C M V ..... Milne  
 Champion HW3 ..... Champion  
 Chromo-High V ..... Bethlehem  
 Crovan ..... Atlas  
 Dica B Vanadium ..... Jessop  
 E 38 Mo ..... Marathon Specialty  
 GW 99-HV Hot  
 Work ..... Great Western  
 H & R Hot Work 5V

Houghton & Richards  
 H. S. C. 33-HV ..... Hoyland  
 H.W.D. 3 ..... Firth Sterling  
 Hi-Van ..... Peninsular  
 Hotform V ..... Vanadium-Alloys  
 Maximold ..... Ziv  
 NonErode Die Casting ..... Coulter  
 NuDie V ..... Crucible Steel  
 P. H. Van ..... Pennsylvania  
 Potomac M ..... Allegheny Ludlum  
 Pressurdie 3 ..... Braeburn Alloy  
 Thermold AV ..... Universal-Cyclops  
 UHB Orvar ..... Uddeholm  
 V. D. C. ..... Latrobe  
 V-HW ..... Republic  
 Vanadium Castdie ..... Columbia  
 Vanadium Firedie Heat-  
 Resisting ..... Columbia  
 Viscount 20 ..... Latrobe  
 Viscount 44 ..... Latrobe  
 Vulcan Vulcast ..... Vulcan-Kidd

**H14**

CCS ..... Crucible Steel  
 E 612 ..... Marathon Specialty  
 H & R 55 ..... Houghton & Richards  
 K-S ..... Universal-Cyclops  
 Lumdie ..... Latrobe  
 Red Indian ..... Atlas

**H16**

K-R ..... Universal-Cyclops  
 W. C. R. ..... Firth Sterling

**H20**

Hotpress ..... Vanadium-Alloys

**Tungsten Base****H21**

2B-LC ..... Jessop  
 57HW ..... Bethlehem  
 3074 Hot Work ..... Milne  
 Air Hardening No. 30 ..... Republic  
 Atlas A ..... Allegheny Ludlum  
 B-44-J ..... Universal-Cyclops  
 Boker Hot-Work Die Steel ..... H. Boker  
 C. L. W. Hot Work ..... Latrobe  
 D-C-66 ..... Kloster  
 F. C. 14 ..... Allegheny Ludlum  
 Formite No. 2 Hot Work ..... Columbia  
 GW 310 Hot Work ..... Great Western  
 H & R Hot Work 2

Houghton & Richards  
 H. S. C. 310 ..... Hoyland  
 Hodi ..... Atlas  
 L. T. Forging ..... Firth Sterling  
 L. T. L. ..... Firth Sterling  
 Maccos P-175 High Speed ..... McDonald  
 Marvel ..... Vanadium-Alloys  
 P.H.-9 ..... Pennsylvania  
 Peerless A ..... Crucible Steel  
 Seneca ..... Atlas  
 Simonds D.N.V. ..... Simonds  
 Special W ..... Marathon Specialty  
 T-Alloy A ..... Braeburn Alloy  
 T-K ..... Carpenter

Vulcan 30 Calo Ferro ... Vulcan-Kidd  
 Vulcan A-42 ..... Vulcan-Kidd

**H22**

2B-HC ..... Jessop  
 Atlas B ..... Allegheny Ludlum  
 B-44 ..... Universal-Cyclops  
 H & R Hot Work  
 Houghton & Richards  
 Peerless LCT2 ..... Crucible Steel  
 T-Alloy ..... Braeburn Alloy

**H23**

B.D.C. ..... Firth Sterling  
 H & R Hot Work 12  
 Houghton & Richards  
 Halcomb 236 ..... Crucible Steel  
 Kalkos ..... Latrobe  
 Thor ..... Universal-Cyclops  
 WW Hotwork ..... Vanadium-Alloys

**H24**

2B-MC ..... Jessop  
 57 Special Hot Work ..... Bethlehem  
 A H No. 40 ..... Republic  
 B-4-B ..... Universal-Cyclops  
 CHW ..... Latrobe  
 Formite No. 3 Hot Work ..... Columbia  
 Maccos P-150 High Speed ..... McDonald  
 Mohawk Hot Die ..... Allegheny Ludlum  
 SC Special ..... Vanadium-Alloys  
 T-Alloy B ..... Braeburn Alloy  
 Vulcan 50 Calo Ferro ..... Vulcan-Kidd

**H25**

B-4-A ..... Universal-Cyclops  
 EHW No. 1 ..... Latrobe  
 Forge-Die ..... Vanadium-Alloys  
 GW 313 Hot Work ..... Great Western  
 H & R Hot Work 15

Houghton & Richards  
 H. S. C. 313 ..... Hoyland  
 Maccos P-125 High Speed ..... McDonald  
 Peerless LLCT ..... Crucible Steel  
 XDL ..... Firth Sterling

**H26**

B-6-X ..... Universal-Cyclops  
 Clarite HW ..... Columbia  
 Clarite J ..... Columbia  
 Electrite 5 ..... Latrobe  
 H & R 50 ..... Houghton & Richards  
 "J" Temper RCS

Houghton & Richards  
 PW 16 ..... Marathon Specialty  
 Rex AA PX Temper ..... Crucible Steel  
 Spartan-5 ..... Atlas  
 Star-Zenith Low C ..... Carpenter  
 Vulcan Wolfram Low C ..... Vulcan-Kidd  
 XDH ..... Firth Sterling

**Molybdenum base****H41**

H & R 550 ..... Houghton & Richards  
 Mohican-6 ..... Atlas  
 MoTung (0.65C) ..... Universal-Cyclops

**H42**

Bedco M-2 High Speed ..... Bedford Tool  
 Electrite 7 ..... Latrobe  
 H & R 45 ..... Houghton & Richards  
 Mo 20S ..... Marathon Specialty  
 MoTung 652 (0.60C)  
 Universal-Cyclops  
 Vulcan TM-6 Low C ..... Vulcan-Kidd

**H43**

HW-8 ..... Bethlehem  
 Molite HW 10 ..... Columbia  
 MoVan (0.55C) ..... Universal-Cyclops  
 Non Scuff Hot Work ..... Coulter

**High Speed****Molybdenum Base****M1**

8-N-2 ..... Vanadium-Alloys  
 Achorn M-1 High Speed ..... Achorn  
 Amoutun ..... Atlantic  
 Boker 847 ..... H. Boker  
 Electrite Tatmo ..... Latrobe  
 HMHS ..... Bethlehem  
 H & R Molyhi ..... Houghton & Richards  
 Hi-Mo ..... Firth Sterling  
 LMW ..... Allegheny Ludlum  
 Mo 10 ..... Marathon Specialty  
 Mocut ..... Braeburn Alloy  
 Mogul ..... Jessop  
 Mohican-8 ..... Atlas  
 MoTung ..... Universal-Cyclops  
 Rex TMO ..... Crucible Steel  
 Simonds S.T.M. ..... Simonds  
 Star Max ..... Carpenter  
 Tensiloy Nitriding Die ..... Allied  
 Vulcan Vul-Mo ..... Vulcan-Kidd

**M2**

66HS ..... Bethlehem  
 A. S. No. 66 ..... Ackerlind  
 Achorn M-2 High Speed ..... Achorn  
 Bedco M-2 High Speed ..... Bedford  
 Braemow ..... Braeburn Alloy  
 DBL-2 ..... Allegheny Ludlum  
 Delaware H.S. ..... Delaware  
 Electrite Double Six M-2 XL ..... Latrobe  
 GW 6-6-2 ..... Great Western  
 H & R 57 ..... Houghton & Richards  
 H. S. C. 6-6-2 ..... Hoyland  
 MT6 ..... Darwin & Milner  
 MM 6 and 6 ..... Milne  
 Mo 20 ..... Marathon Specialty  
 Molite High Speed ..... Columbia  
 Molite Smoothcut ..... Columbia  
 MoTung 652 ..... Universal-Cyclops  
 Mustang ..... Jessop  
 Penn-Cut-Moly ..... Pennsylvania  
 Record 66 ..... Boyd-Wagner  
 Red Shadow High Speed ..... Ziv  
 Rex M-2 ..... Crucible Steel  
 Simonds Molva T ..... Simonds  
 Sixix and Sixix-fm ..... Atlas  
 Special M-O High Speed ..... Republic  
 Speed Star ..... Carpenter  
 Star-Mo-M-2 ..... Firth Sterling  
 Twin Mo. ..... H. Boker  
 Vasco M-2 ..... Vanadium-Alloys  
 Vulcan TM-6 ..... Vulcan-Kidd  
 Vulcan TM-6 F. M. ..... Vulcan-Kidd  
 Victory ..... Lehigh

**M3**

Atlas M-3 ..... Atlas  
 Braevan ..... Braeburn Alloy  
 Brilliant MM ..... Swedish-American  
 DBL 2½ ..... Allegheny Ludlum  
 DBL-3 ..... Allegheny Ludlum  
 Darwin M3 ..... Darwin-Milner  
 Electrite Corsair XL ..... Latrobe  
 Electrite Crusader XL ..... Latrobe  
 F.S.M. 2½ ..... Firth Sterling  
 H & R 7 Types 1 & 2

Houghton & Richards  
 Jessop M-3 ..... Jessop  
 MMV ..... Milne  
 Mo 30 ..... Marathon Specialty  
 Molite 3 ..... Columbia  
 Rex M-3 ..... Crucible Steel  
 Super Speed Star ..... Carpenter  
 Twin Mo Va 3 ..... H. Boker  
 Unicut ..... Universal-Cyclops  
 Van Chip ..... Firth Sterling  
 Van Cut ..... Vanadium-Alloys  
 Vulcan Vul-Bro ..... Vulcan-Kidd

**M4**

Atlas M-4 .....Atlas  
Neatro .....Vanadium-Alloys

**M6**

Congo .....Braeburn Alloy

**M7**

HV-H-MO .....Firth Sterling  
Mo 19 .....Marathon Specialty  
MoTung CV .....Universal-Cyclops  
Tatmo V High Speed .....Latrobe

**M10**

Beth. M-10 .....Bethlehem  
Electrite TNW .....Latrobe  
F.S.M. 10 .....Firth Sterling  
F.S.M.-10 (mod.) .....Firth Sterling  
H & R Moly Van  
Houghton & Richards  
Jessop M-10 .....Jessop  
MoVan .....Universal Cyclops  
Rex VM .....Crucible Steel  
Ten Star .....Carpenter  
Van-Lom .....Vanadium Alloys

**M15**

Electrite Ultravan .....Latrobe  
Super Unicut .....Universal-Cyclops  
Vasco Supreme A .....Vanadium-Alloys

**M30**

8-N-2 Cobalt .....Vanadium-Alloys  
H & R Super Molyhi  
Houghton & Richards  
Super HiMo .....Firth Sterling  
Super MoTung .....Universal-Cyclops

**M34**

Atlas M-34 .....Atlas  
Super MoTung Special  
Universal-Cyclops

**M35**

Komo 205 .....Marathon Specialty  
Jessop Mustang Special .....Jessop  
Rex M2-5 .....Crucible Steel  
Super Star-Mo 2-5 .....Firth Sterling

**M36**

Circle "M" .....Firth Sterling  
Electrite CO-6 .....Latrobe  
H & R Cobalt Moly  
Houghton & Richards  
MMCO .....Milne  
Super DBL .....Allegheny Ludlum  
Twin Mo-Co .....H. Boker

**Tungsten Base****T1**

AMC .....Milne  
Achor High Speed .....Achor  
Atlantic H. S. ....Atlantic  
B-6 .....Universal-Cyclops  
B-F High Speed .....Republ  
Blue Chip .....Firth Sterling  
Blue Streak .....Diehl  
Brilliant W W .....Swedish-American  
Cannon .....Darwin & Milner  
Clarite High Speed .....Columbia  
Clipper .....Kloster  
Electrite 1 XL .....Latrobe  
GW Silver Stripe .....Great Western  
H & R 1 .....Houghton & Richards  
H. S. C. 18-4-1 .....Hoyland  
High Speed .....Faitoute  
High Speed Drill Rod .....Pittsburgh  
LXX .....Allegheny-Ludlum  
Macco Superior High  
Speed .....McDonald  
Novo Superior .....H. Boker

Penn-Cut .....Pennsylvania  
Rapid Special .....Marathon Specialty  
Record Superior .....Boyd-Wagner  
Red Cut Superior .....Vanadium-Alloys  
Rex AA .....Crucible Steel  
Simonds Red Streak .....Simonds  
Spartan-7 .....Atlas  
Special HS .....Bethlehem  
Star-Zenith .....Carpenter  
Super High Speed Steel .....Ziv  
Supremus .....Jessop  
Vincos .....Braeburn Alloy  
Vulcan Wolfram .....Vulcan-Kidd

**T2**

Atlantic V .....Atlantic  
B-9 .....Universal-Cyclops  
BRM High Speed .....Ziv  
Canon Special .....Darwin & Milner  
E.V.M. ....Vanadium-Alloys  
Electrite 19 .....Latrobe  
H & R 2 .....Houghton & Richards  
H. V. Blue Chip .....Firth Sterling  
IXL High Speed .....Republic  
Lehigh XXX .....Lehigh  
ML .....Allegheny Ludlum  
Meridian HS Steels .....Meridian  
Milvan .....Milne  
Novo 2 .....H. Boker  
OOO Extra .....Marathon Specialty  
Rex Supervan .....Crucible Steel  
Simonds Lockport Spe-  
cial .....Simonds  
Supremus Extra .....Jessop  
Tensiloy High Speed .....Allied  
Trojan .....Atlas  
Twinvan .....Braeburn Alloy  
Vanite High Speed .....Columbia  
Vulcan Super .....Vulcan-Kidd

**T3**

Electrite Vanadium .....Latrobe  
H & R 3 .....Houghton & Richards  
Novo Superior .....H. Baker

**T4**

Acmite .....Columbia  
Atlantic C .....Atlantic  
B-7 .....Universal-Cyclops  
Cobalt .....Braeburn Alloy  
Cobalt High Speed .....Ziv  
Comokut .....Bethlehem  
Darwin 505 .....Darwin & Milner  
Electrite Cobalt .....Latrobe  
GW Superkut .....Great Western  
H & R Cobalt .....Houghton & Richards  
H. S. C. Cobalt 5 .....Hoyland  
Hyco .....Lehigh  
Kobalt II .....Marathon Specialty  
Panther Spec. ....Allegheny Ludlum  
Powhatan .....Atlas  
Purple Label .....Jessop  
Red Chip .....Firth Sterling  
Red Cut Cobalt .....Vanadium Alloys  
Republic Cobalt High  
Speed .....Republic  
Rex AAA .....Crucible Steel  
Simonds Tunco .....Simonds  
Vulcan Wolfram Co-  
balt .....Vulcan-Kidd

**T5**

B-10 .....Universal-Cyclops  
Bonded Carbide Jr. ....Braeburn Alloy  
Circle "C" .....Firth Sterling  
Cobite Cobalt High  
Speed .....Columbia  
Darwin 505 Special  
Darwin & Milner  
Electrite Super Cobalt .....Latrobe  
H & R 4 .....Houghton & Richards  
Milco 9 .....Milne  
Nipigon .....Atlas  
Penn-Cut 5 .....Pennsylvania

Purple Label Extra .....Jessop  
Red Cut Cobalt B .....Vanadium-Alloys  
Rex Supercut .....Crucible Steel  
Simonds Super Cobalt .....Simonds  
Super Panther .....Allegheny Ludlum  
Zip High Speed Steel .....Ziv

**T6**

Bonded Carbide Sr. ....Braeburn Alloy  
Darwin 1366 .....Darwin & Milner  
Gray Cut Cobalt .....Vanadium-Alloys  
H & R Super Cobalt  
Houghton & Richards  
King Cobalt .....Jessop  
Kobalt I .....Marathon Specialty  
Lehigh S. S. ....Lehigh  
Macco Enormous .....McDonald  
Major .....Milne  
Rex 440 .....Crucible Steel  
Tensiloy Cobalt-Tung-  
sten High Speed .....Allied

**T7**

SA 200 .....Marathon Specialty  
Rex Champion .....Crucible Steel  
Star Blue Chip .....Firth Sterling

**T8**

B-8 .....Universal-Cyclops  
F. S. 2-5 .....Firth Sterling  
Gold Star .....Carpenter  
Rex 95 .....Crucible Steel

**T9**

Carvite High Speed .....Columbia  
Rex 4-V .....Crucible Steel

**T15**

Electrite Dynavan .....Latrobe  
H & R 445 .....Houghton & Richards  
SA 900 .....Marathon Specialty  
Sabre .....Atlas  
Vasco Supreme .....Vanadium-Alloys

**Special Purpose****Low Alloy****L1**

Alloy B .....Universal-Cyclops  
CRS .....Marathon Specialty  
Presto .....Carpenter  
Vulcan Superior Chrome  
Vulcan-Kidd  
WKL .....Marathon Specialty

**L2**

Albany .....Allegheny Ludlum  
Caroga .....Allegheny Ludlum  
Demmler D .....Firth Sterling  
H & R 15 .....Houghton & Richards  
H & R 85 .....Houghton & Richards  
Halvon .....Crucible Steel  
Orion .....Universal-Cyclops  
Tough M .....Bethlehem  
Vanadium Types .....Vanadium-Alloys  
Vulcan Auto .....Vulcan-Kidd  
Vulcan Hecla .....Vulcan-Kidd  
Vulcan Hecla Special .....Vulcan-Kidd

**L3**

A. W. Special .....Firth Sterling  
Vanadium BB .....Vanadium Alloys

**L5**

14MS .....Universal-Cyclops  
CRM Special .....Marathon Specialty

**L6**

Amcoloy 70 .....Milne  
Atlantic Die .....Atlantic



Bethalloy ..... Bethlehem  
Coldhot ..... Finkl  
Darwin Temper Tough ..... Darwin-Milner  
Econo 2 ..... Champion  
H & R N-150 ..... Houghton & Richards  
Hy-Ten "M" Temper ..... Wheelock, Lovejoy  
N-9 ..... Universal-Cyclops  
N C Alloy ..... Lehigh  
Nikro M ..... Vanadium-Alloys  
NonChallenge O. H. ..... Coulter  
R. D. S. ..... Carpenter  
Tioga ..... Allegheny Ludlum  
Vulcan Nicroman ..... Vulcan-Kidd

## L7

14MS ..... Universal-Cyclops  
Atlas KK ..... Atlas  
Framdie ..... Columbia  
H & R 135 ..... Houghton & Richards  
Halcomb SS ..... Crucible Steel  
Teton ..... Allegheny Ludlum  
UA-8 ..... Republic  
Viking ..... Braeburn Alloy

## Carbon Tungsten

### F1

Meteor ..... Firth Sterling  
Para ..... Universal-Cyclops  
WS 1 Extra ..... Marathon Specialty

## F2

Atlas XXX ..... Atlas  
BFS ..... Bethlehem  
Colonial No. 4 ..... Vanadium Alloys  
Columbia Double Special ..... Columbia  
H & R Gold Label ..... Houghton & Richards  
RT ..... Firth Sterling  
K-W ..... Carpenter  
Saturn ..... Universal-Cyclops

## F3

Crucible Double Special ..... Crucible Steel

## Mold Steels—Low Carbon

### P1

A. S. Special Hobbing Iron. Ackerlind  
GW Rema Iron ..... Great Western  
H & R Plastic Mold C ..... Houghton & Richards  
Macco Hobomold "C" ..... W. O. H. McDonald  
Mirromold ..... Carpenter  
UH Forma ..... Uddeholm  
Vulcan Plastic Die ..... Vulcan-Kidd  
WE Extra ..... Marathon Specialty

### P2

A. S. Duramold B ..... Ackerlind  
Duramold B ..... Bethlehem  
Formold ..... Crucible Steel  
Hob-A-Die ..... Ziv

Penco OCS ..... Peninsular  
Vulcan Vulmold ..... Vulcan-Kidd

## P4

Duramold A ..... Bethlehem  
H & R Plastic Mold ..... Houghton & Richards  
Macco Hobomold "A" ..... McDonald  
Penco Air Shock ..... Peninsular  
Super Samson ..... Carpenter  
UHB Premo ..... Uddeholm  
WE 5 ..... Marathon Specialty

## P5

H & R Plastic Mold B ..... Houghton & Richards  
Macco Hobomold "B" ..... McDonald  
Samson Extra ..... Carpenter

## P6

158 Plastic Mold Steel ..... Carpenter  
Duramold N ..... Bethlehem  
Suprimacto ..... Atlas

## Other

### P20

C S M 2 ..... Crucible Steel  
Giant Special ..... Champion  
H & R Multimold ..... Houghton & Richards  
Hy-Ten Mold Steel ..... Wheelock, Lovejoy  
Multimold ..... Bethlehem  
Plasdie ..... Columbia  
Zincdie ..... Columbia

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Cleveland 3, Ohio

Atlantic Steel Corp.  
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Kloster Steel Corp.  
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Cleveland 3, Ohio

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Athol, Mass.

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New York 17, N. Y.

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Bridgeport, Pa.; Titusville, Pa.

Vanadium-Alloys Steel Co.  
Latrobe, Pa.

Vascoloy-Ramet Corp.  
Waukegan, Ill.

Vulcan-Kidd Steel Div.  
Aliquippa, Pa.

Vulcan Steel Corporation  
Birmingham 5, Alabama

Wheelock Lovejoy & Co., Inc.  
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Chicago 12, Ill.

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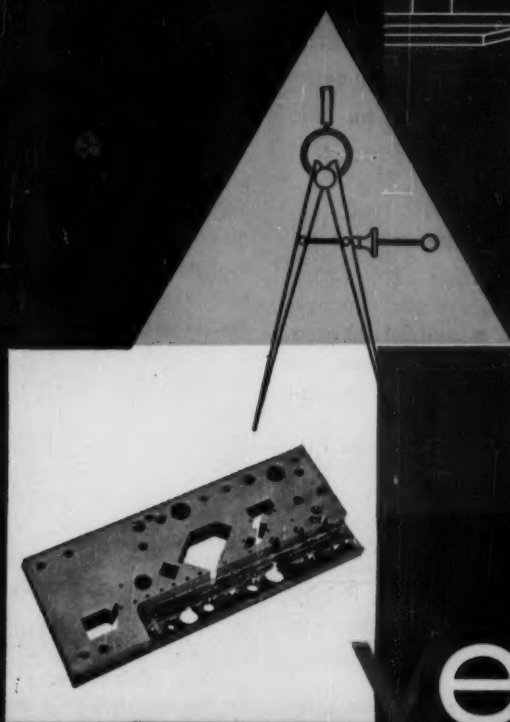
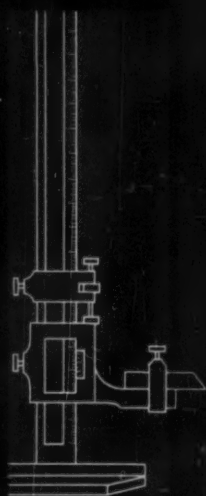
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## FREE TECHNICAL LITERATURE

# New Catalogues And Bulletins

**Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 135.**

### Company Profile

In commemoration of its 75th year in business, a major corporation has issued a colorful 20-page booklet. It gives a rather intimate view of the organization: (Harnischfeger Corp.)

For free copy circle No. 1 on postcard, p. 135

### Buffing, Polishing

Metal finishing compounds are presented in a 20-page bulletin. More than 150 buffing and polishing compounds and their uses are described. (Hanson-Van Winkle-Munning Co.)

For free copy circle No. 2 on postcard, p. 135

### Coupling Locknut

Fluid coupling nuts now are available which have positive, self-locking action. They maintain tight, leakproof joints on critical fuel, hydraulic control and other fluid lines. A 4-page bulletin gives details. (Standard Pressed Steel Co.)

For free copy circle No. 3 on postcard, p. 135

### Zirconium Crucibles

Zirconium fusion crucibles described in a folder are deep drawn from pure zirconium strip. "They are the most durable of any commercially available vessels in which peroxide and carbonate fusions may

be conducted," the folder points out. (Oregon Metallurgical Corp.)

For free copy circle No. 4 on postcard, p. 135

### Finned Tubing

Announced in a new catalog is a significant 13 pct increase in the outside surface area of one producer's integral finned tube. The surface increase results from a redevelopment of fin contour. This means savings in tube required in shell and tube heat exchangers. (Wolverine Tube Div., Calumet & Hecla, Inc.)

For free copy circle No. 5 on postcard, p. 135

### Forming Presses

Metal forming presses are covered in a 16-page catalog. Electric, air and hand-operated hydraulic presses are reviewed. So are arbor presses, utility presses, and special presses. (Dake Corp.)

For free copy circle No. 6 on postcard, p. 135

### Analyzer Rental

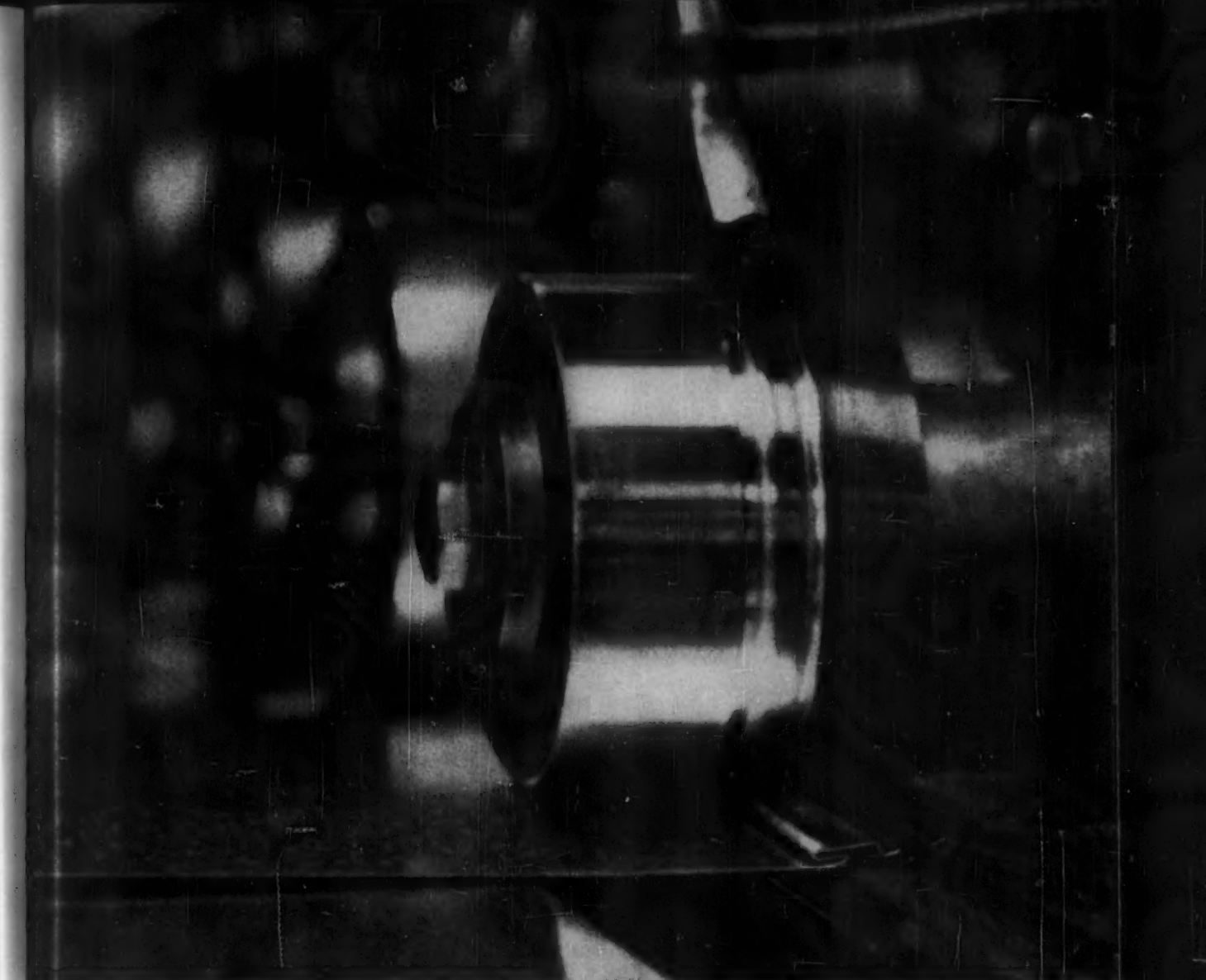
Rental of a giant electrical network analyzer for power-system studies on a time basis is offered in an 8-page bulletin. (I-T-E Circuit Breaker Co.)

For free copy circle No. 7 on postcard, p. 135

### Control Meter

Recently developed, a miniature electronic control meter is announced in a data sheet. The meter differs from conventional ones because it works without using contacts at the set points. This means the pointer's movement doesn't stop at the set points; full scale range is





**"LOCK SEAMS GIVE US TROUBLE? NO SIR—WE USE WEIRKOTE!"**

When it comes to the rigors of lock-seaming, nothing can take it like Weirkote.

Why? Because Weirkote combines the strength of steel with a tightly bonded continuous process zinc coating that remains intact through the severest fabricating steps. No chipping. No peeling. In fact, Weirkote can be worked to the very limits of the steel itself and still come through with a smooth, even, corrosion-resistant zinc coating on both sides of every crease.

So whether your product is crimped or drawn, spun or twisted, Weirkote means a new high in production results, corrosion prevention and customer goodwill—a new low in costly, worrisome rejects.

Weirkote's low initial price, combined with these production savings, insures the economical quality you may have been looking for. Why not investigate further by sending for the 12-page Weirkote booklet that explains how Weirkote can help you both in your products and in your production. Just write to Weirton Steel Company, Dept. A-13, Weirton, West Virginia.

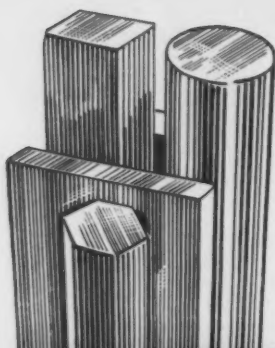


**WEIRTON STEEL  
COMPANY**

WEIRTON, WEST VIRGINIA

a division of

**NATIONAL STEEL CORPORATION**



Want  
**Positive  
Uniformity**  
in your **COLD FINISHED  
STEELS?**

then **INVESTIGATE**

# WYCKOFF

CARBON CORRECTED  
**STEELS**

## THEY PROVIDE:

1. Predetermined and uniform microstructure
2. Excellent machinability for the grade
3. Can be induction hardened to full hardness without metal removal
4. Optimum fatigue resistance



**WYCKOFF STEEL COMPANY**

GENERAL OFFICES:

Gateway Center, Pittsburgh 30, Pa.

Branch Offices in Principal Cities

Works: Ambridge, Pa.

Chicago, Ill., Newark, N.J.—Putnam, Conn.

**WYCKOFF STEEL PRODUCTS** • Carbon, Alloy and Lead Steels • Turned and Polished Shafting • Turned and Ground Shafting • Large Squares • Wide Flats up to 12 $\frac{3}{4}$ " x 2 $\frac{1}{4}$ " and 14" x 1 $\frac{1}{4}$ " • All types of Furnace Treated Steels including Carbon Corrected Steels

available for readings at all times. The meter's scale length is 2.7 in. Panel area is 5.5 sq in. (International Instruments, Inc.)

For free copy circle No. 8 on postcard, p. 135

## Boring, Turning

A 16-page brochure shows 14 different machining setups. It tells how you can combine various operations on a unit-type automatic machine. Operations include straight and taper boring, straight and taper turning, facing, chamfering, grooving diameters and faces, and reaming. (Heald Machine Co.)

For free copy circle No. 9 on postcard, p. 135

## Rust Prevention

An 8-page technical brochure deals with rust-prevention. It describes a new anti-corrosive pigment which is suited for formulation of primers, intermediate and finish coats. (The Eagle-Pitcher Co.)

For free copy circle No. 10 on postcard, p. 135

## Magnets

Alnico-V permanent magnets described in a catalog are for microwave load isolators. The magnets are available for immediate shipment from stock. (Indiana Steel Products Co.)

For free copy circle No. 11 on postcard, p. 135

## Automatic Assembly

Profitable automatic assembly despite low production rates or requirements is possible, points out a bulletin. It discusses methods of tooling machines with slow cyclic rates. Machines produce multiple assemblies simultaneously. Equipment can, with minor changes, adapt to producing different, but basically similar, items. (Ferguson Machine Corp.)

For free copy circle No. 12 on postcard, p. 135

## Fluid Filtering

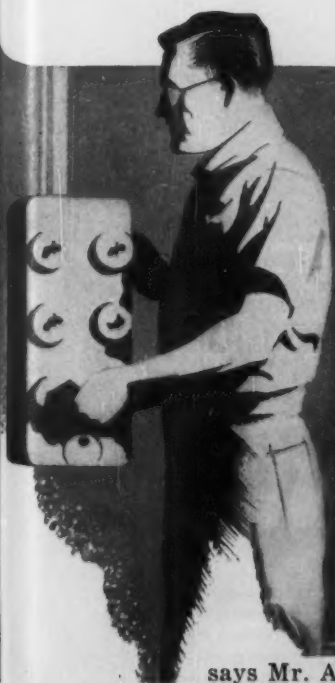
A data sheet outlines features of a 2-5 micron fluid filtration cart. This portable filtration unit serves precision hydro-mechanical circuits of missiles, aircraft or other hy-

**"We've attained  
CONTROLLED  
PRODUCTION**

**with our**

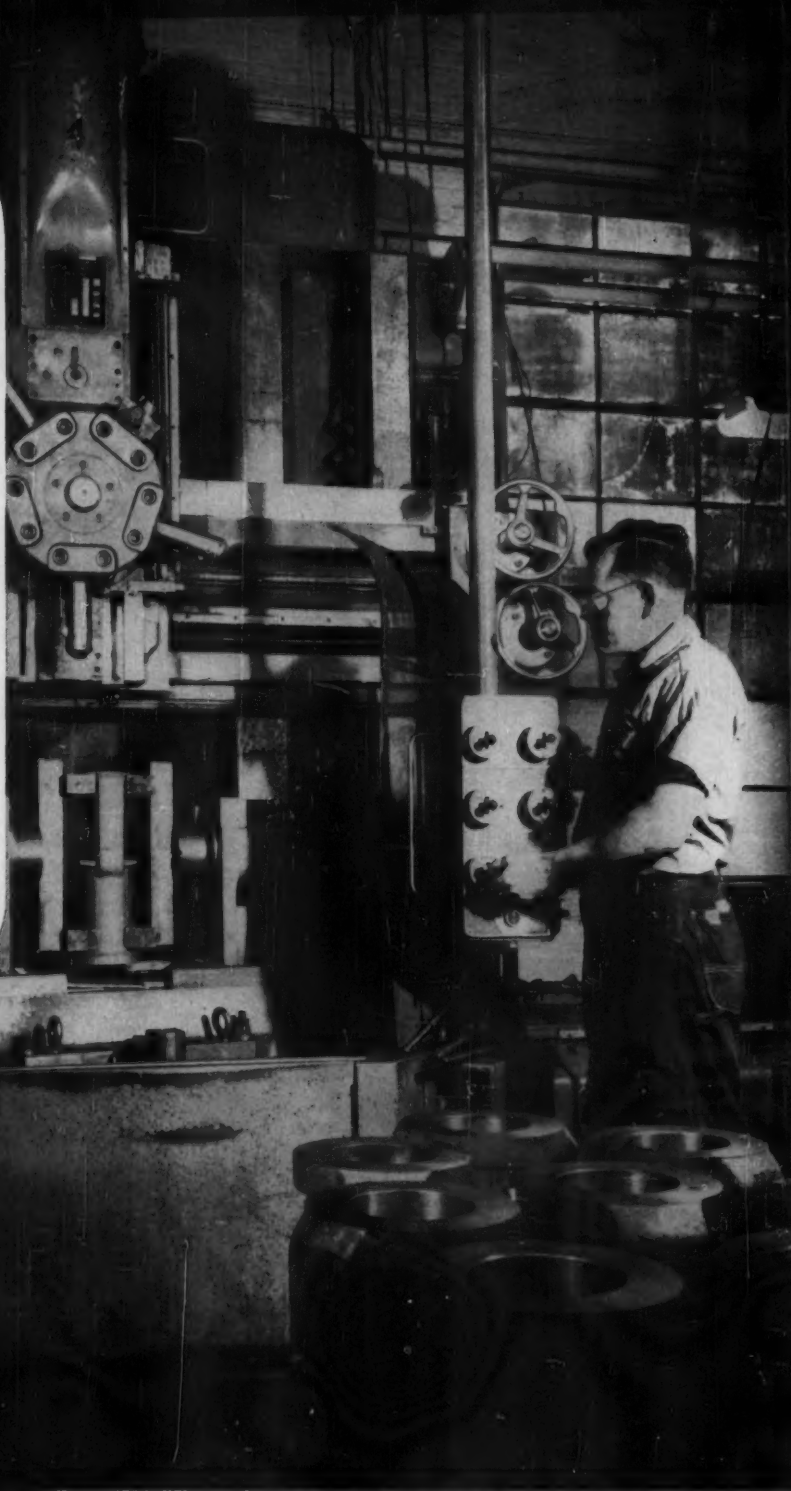


**Cut Master, Model 75,"**



says Mr. Anthony Scelba, Industrial Engineer of Leslie Co., Lyndhurst, New Jersey, manufacturers of regulators and controllers for industrial and marine steam systems.

Combining a specially designed indexing fixture, which permits indexing the piece in increments of 45° and with the automatic features of Cut Master, every piece leaving the machine is completely finished on all surfaces. This reduces the number of set-ups, for instance, on a four way valve from four set-ups to one. In this manner, production is controlled and a minimum inventory required.



Similar cost saving methods can be applied to your machining problems just call your nearest Bullard Sales Office or Distributor.

**THE  
BULLARD  
COMPANY  
BRIDGEPORT 9,  
CONNECTICUT**



# AVOID RISK If you buy steel...

## USE OUR INVENTORY to continue your cost-control program

**Worried about inventory?** Want to put yourself in a position to assure continuity of production while holding down burdensome overhead? Then talk things over with your Steel Service Center.

**It's only good business** to avoid big-inventory risks. That way you make more productive use of capital and save on space, handling, obsolescence and wastage. Yet with your Steel Service Center you have adequate inventory to draw on at all times.

**And it makes sense** to continue your

cost-control program. Why not continue free-of-risk steel buying from your Steel Service Center . . . get *all* the steel you need delivered *when* you need it, cut to exact size and ready for use.

**Compare all your costs** of inventoried steel with the cost of steel delivered as needed. Use the chart at the right. Or get the booklet, *What's Your Real Cost of Possession for Steel?* Ask your nearby Steel Service Center, or write to American Steel Warehouse Assn., 540 Terminal Tower, Cleveland 13, Ohio.



The American Steel Warehouse  
...YOUR STEEL SERVICE CENTER

### COST OF POSSESSION FOR STEEL IN YOUR INVENTORY

|                    |       |
|--------------------|-------|
| Per ton delivered  | _____ |
| Cost of capital:   | _____ |
| Inventory          | _____ |
| Space              | _____ |
| Equipment          | _____ |
| Cost of operation: | _____ |
| Space              | _____ |
| Materials handling | _____ |
| Cutting & burning  | _____ |
| Scrap & wastage    | _____ |
| Other costs:       | _____ |
| Obsolescence       | _____ |
| Insurance          | _____ |
| Taxes              | _____ |
| Accounting         | _____ |
| <b>TOTAL</b>       | _____ |

### COST OF FREEDOM-FROM-RISK STEEL FROM YOUR STEEL SERVICE CENTER

|                                     |       |
|-------------------------------------|-------|
| Per ton, cut-to-size, and delivered | _____ |
| <b>TOTAL</b>                        | _____ |

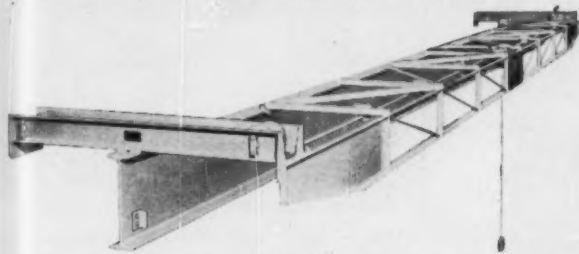
# BUY OR BUILD YOU SAVE WITH MMM CRANES

New economy, safety and load-handling efficiency can be yours with an MMM Crane. More than 70 years of crane-building experience is your assurance of the finest workmanship, materials and structural and operational features.

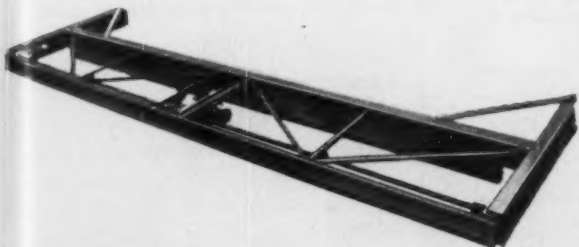
"Build-it-yourself" components are available to assemble bridges for cranes up to 10 tons and spans to 50 feet. Pre-engineered, highly standardized components for many other cranes we construct on order, reduce costs substantially for owners. Engineered to the job Shaw-Box Cranes, in various types and in capacities to 500 tons and more, are serving all kinds of industries.

Whatever your crane needs, we invite your inquiry. Ask for Bulletin 15025-1A.

## ELECTRIC TRAVELING CRANES



**Type NE-SUH Load Lifter Crane.** Up to 10 tons, 50-foot span. Popular in paper mills, warehouses, structural plants to serve a main bay or local area. Single girder, underhung. Operates on straight or tapered I-beam flange. Available with transfer bridge. End trucks have 6-ft. wheel base. Wheels adjustable to fit 8" to 24" I-beams. "Shaw-Matic" bridge drive provides smooth, cushioned acceleration and braking. Safer, faster spotting action. Pendant push-button control. Three speeds. Maximum 150 FPM with full load.



**Type SBE Load Lifter Crane.** Up to 5 tons, spans to 40 feet. Widely used in side bays in machine shops, paper mills and other plants of moderate size. Single girder, top running. Pendant push-button control. Three speeds. Maximum 150 FPM with full load.

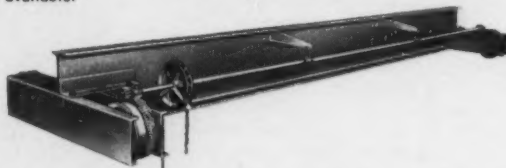


**Shaw-Box Hydraulic Crane.** Up to 10 tons. Has one electric motor (explosion-proof design) to power 3 hydraulic motors — two to operate the bridge, one for trolley traverse. Infinitely variable hydraulic control. Hoisting action achieved by unique hydraulic lifting mechanism. Extremely fine positioning obtainable. No load brake. No hoist, trolley traverse, or bridge center assembly gears. Maintenance problems reduced 75%.

## HAND-OPERATED CRANES



**Type NH-SUH Load Lifter Crane.** Up to 10 tons, spans to 50 feet. "Build it yourself" components to construct a single girder, underhung crane bridge at low cost right in your plant. Standard components include two assembled end trucks with 6-foot wheel base and wheels that can be adjusted to fit 8" to 24" runway beams. Also provided are shaft bracket and couplings and bearing assemblies; chain wheel and guide and 20 foot hand chain. You buy I-beam and cross shaft locally — save freight costs. Suitable hand or electric hoist available.



**Type SBR Load Lifter Crane.** ½ to 10 tons, spans to 40 feet. Single girder, top running. Particularly useful for accurate manual "spotting" and where travel length is moderate. Suitable hand or electric hoist available.



**Load Lifter Jib Cranes.** ¼ to 5 tons. Revolve smoothly through full circle on ball and roller bearings. No binding. Types that bolt to floor serve up to 550 sq. ft. Others set in concrete foundation; serve up to 1500 sq. ft.

**Type BR Load Lifter Crane.** 3 to 50 tons, spans to 60 feet. Double girder, top running. Widely used in power plants, pumping stations, stone crushing plants, and warehouses. Two lifting speeds. 28 to 37½ foot lifts. Geared to save energy. Fast acting load brake. Wire rope does not overlap on drum. No tail chains to hang and foul the load.



**Budget Bridge Drive.** Used to convert hand-operated cranes up to 10 tons to electrical operation at low cost. No drilling or machining. Push-button control. Crane travels at walking speed.

**Budget Gantry "A" Frame.** ½ and 2 tons. Caster equipped. For low cost mobile hoisting service anywhere in the work area. "A" frames come knocked down, are easy to assemble with I-beam you buy locally.

**Budget Crane Assemblies.** Low-cost "build it yourself" kits available to construct single girder underhung and top running cranes with capacities to 6 tons and spans to 30 feet. You buy I-beam locally and save freight. Other big money savers are kits to build 180° swinging bracket jib cranes up to 4½ tons with reach up to 10 feet.



59L-5



## OVERHEAD LOAD HANDLING EQUIPMENT

Products of

**MANNING, MAXWELL & MOORE, INC.**

Shaw-Box Crane & Hoist Division • Muskegon, Michigan

In Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario

# The Cleaning Method Which Actually UNCHAINS MEN!

It may seem like an echo of the dark ages, but there are actually statutes on the books of most states which require the *chaining of men*. This is a safety requirement when men attempt to clean out vapor degreasers by old-fashioned, dangerous methods. The theory is that — should one man be overcome by the highly toxic fumes while cleaning the inside of the degreaser — the other can haul him out without endangering his own life.

Now, compare this with the modern Magnus "pre-cleaning" method by which 3 to 5% (by volume) of MAGNUSOL is added with the initial charge of degreasing solvent; no more need be added with daily replacement. Yet, when the tanks are to be cleaned, the normally hard scale and caked residues may be washed away with a simple high-pressure water rinse, handled by a single man in complete safety from outside the degreaser.



This is just one dramatic example of ways in which every cleaning operation can be drastically improved by adopting modern Magnus methods of cleaning and protection.

Write today for information on the way that this and other Magnus methods, materials and machines can help you do your cleaning better, safer and more economically.

Magnus Chemical Co., Inc.  
46 South Avenue  
Garwood, New Jersey

Gentlemen:

Please send more information on cleaning out vapor degreasers. ☐

Please send information on better Magnus Methods for \_\_\_\_\_

NAME \_\_\_\_\_

POSITION \_\_\_\_\_

COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_



**magnus**  
CHEMICAL COMPANY INC.

A WORLD-WIDE ORGANIZATION SPECIALIZING IN THE CLEANING AND PROTECTION OF ALL SURFACES

## FREE LITERATURE

draulically operated devices.  
(George L. Nankervis Co.)

For free copy circle No. 13 on postcard, p. 135

## Tracer Control

Tracer control systems described in an 8-page bulletin fit a wide variety of metalworking applications. Vertical boring mills, skin milling machines, center-drive lathes, turret lathes, and contour profile milling machines are discussed. (General Electric Co.)

For free copy circle No. 14 on postcard, p. 135

## Heat Transfer

An 8-page bulletin describes a new multi-zone "Platecoil" heat transfer unit. Explained are applications such as tank and process heating and cooling, heat recovery and oven and furnace applications. A table converts lineal ft of pipe coil to sq ft of "Platecoil." (Tranter Mfg. Inc.)

For free copy circle No. 15 on postcard, p. 135

## Square Nuts

Precision square nuts are presented in a catalog page. Cold formed to standard dimensions, the nuts are double chamfered and double counter-sunk. This means either end can be a seating face. Nuts are ideal for manual or automatic assembly. (National Machine Products Co.)

For free copy circle No. 16 on postcard, p. 135

## Machines, Components

In 18 pages, a catalog deals with automation equipment, components, standard and special machines for metalworking. It covers items like: automatic and manually operated index tables, lead screw tapping units, and vertical drilling and boring machines. Included in the catalog is a metal-cutting chart. It shows such things as drilling feeds, speed, horsepower required, size of drill, feed per revolution. (Michigan Special Machine Co.)

For free copy circle No. 17 on postcard, p. 135





Working proof of Superior stainless quality—*the year around*

# Superior

STAINLESS STRIP STEEL

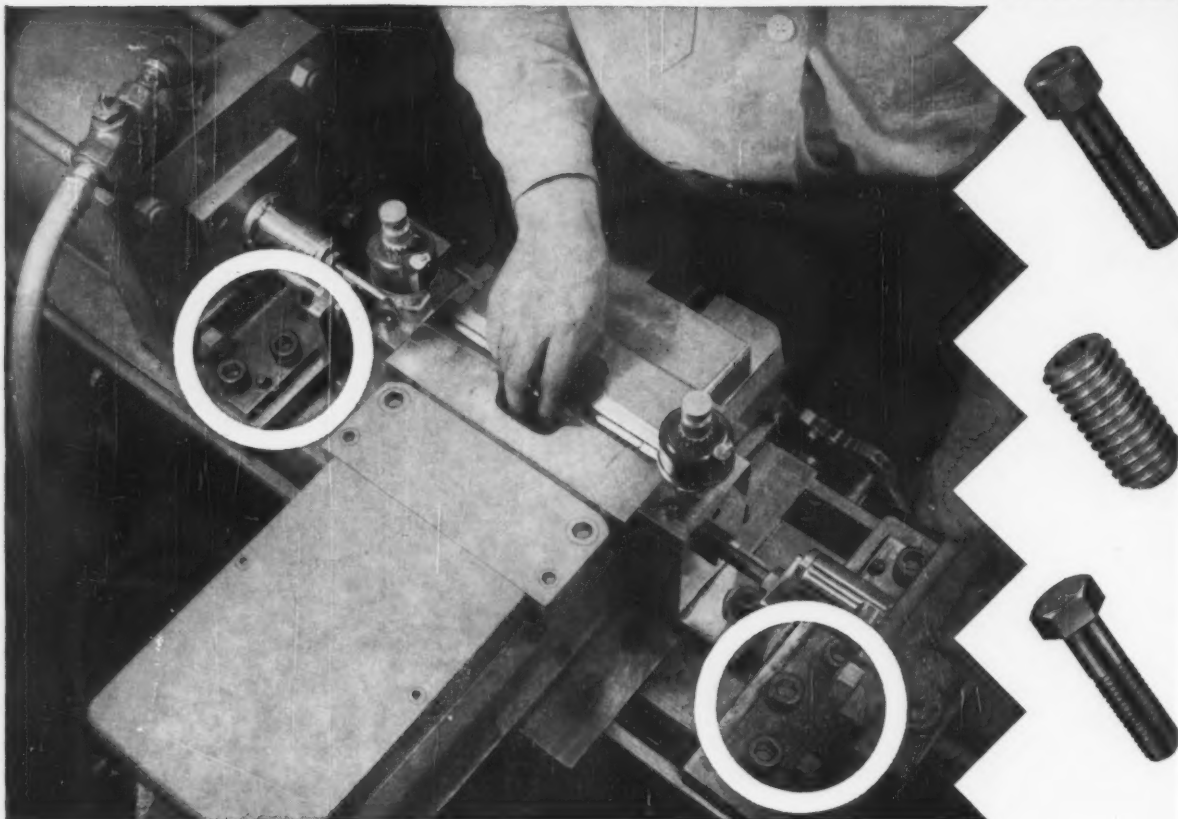
Out front, and ever-bright—looking its best when the weather is worst—Superior Stainless in the millions of windshield wiper assemblies on today's cars speaks for *enduring quality*. The stainless strip is made right to behave right—uniform as can be, from coil to coil. • There's a Superior grade to meet *your* application in every particular. Write.

**Superior Steel Division**

OF



IT PAYS TO STANDARDIZE ON STANSCREW



## A 20-ton impact load ... 14,400 times a day! Stanscrew Fasteners solve the problem

Fastening the air cylinders on this tube former is a real problem. Each of these 8" bore cylinders delivers a thrust of over 20 tons every time the machine is operated. And since this happens 14,400 times in a normal working day, ordinary fasteners would soon fail under these repeated shock loads. Furthermore, not even the slightest misalignment can be tolerated in this machine.

The Stanscrew fastener specialist was able to quickly answer this demanding problem. His solution was Stanscrew Socket Head Cap Screws, tightened to within 80% of yield strength so they remained in tension. These fasteners, so applied, deliver a clamping force that eliminates the shock feature of this extremely high loading ... and provides a 100% factor of safety.

Tough assignments like this are everyday jobs for your Stanscrew fastener specialist. Immediately on call, through your Stanscrew distributor, he can bring to your problem years of specialized experience. And, back of him, is an outstanding staff of engineers who have been solving the fastener problems of American industry since 1872.

Stanscrew's complete line of more than 4,000 different types and sizes will provide economical answers to your fastener requirements. All 4,000 items are always in stock, quickly available.

*Call your Stanscrew distributor today for solutions to your fastener problems. He will arrange a prompt meeting with the Stanscrew fastener specialist ... who can often suggest ways to save you money by substituting standard fasteners for costly specials.*



**STANSCREW FASTENERS**

**STANDARD SCREW COMPANY**

**CHICAGO** | THE CHICAGO SCREW COMPANY, BELLWOOD, ILLINOIS

**HMS** | HARTFORD MACHINE SCREW COMPANY, HARTFORD, CONNECTICUT

**WESTERN** | THE WESTERN AUTOMATIC MACHINE SCREW COMPANY, ELYRIA, OHIO

2701 Washington Boulevard, Bellwood, Illinois

## FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

### Welding Nuts

Where and how best to use welding nuts is told in a booklet. Welding nuts can save time and labor in both fabricating and assembly. They simplify fastener access problems. (Midland-Ross Corp.)

For free copy circle No. 18 on postcard

### Industrial Trucks

For industrial truck users, a 12-page condensed catalog classifies six categories: fork trucks (capacities to 10,000 lb), heavy duty fork and ram trucks (12,000 to 80,000), low lift platform trucks (4000 to 80,000), high lift platform trucks (same range), die handling trucks (to 80,000) and mobile cranes. It details each. (Elwell-Parker Electric Co.)

For free copy circle No. 19 on postcard

### Air Motor Jack

Heavy-duty air motor jacks are illustrated in a 6-page bulletin. Jacks have 20, 35, 50, and 100-ton capacities. (The Joyce-Cridland Co.)

For free copy circle No. 20 on postcard

### Gear Checker

For checking gears, hobs and cutters, a universal checking fixture is described in a 4-page bulletin. (Michigan Tool Co.)

For free copy circle No. 21 on postcard

### Welding Rod

Technical data is available on copper welding rod and wire of Alloy 835. These give high copper

content welds that are sound, ductile and of high strength. (Bridgeport Brass Co.)

For free copy circle No. 22 on postcard

### Speed Lathe

Speed lathes described in a catalog polish, lapp, deburr and do other secondary finishing work. The 16-page catalog covers bench and floor type speed lathes, having fixed or variable speed motors, with collet, chuck and vacuum holding fixtures. (Schauer Mfg. Corp.)

For free copy circle No. 23 on postcard

### Carbide Tools

Price and engineering data on 1230 standard-stock, solid carbide tools and burs appear in a 148-page catalog. (The Atrax Co.)

For free copy circle No. 24 on postcard

### Fabrication

A catalog explains a system of punching, notching, nibbing and drilling. Valid time studies cover various fabrication operations using the stem. (For free copy write on company letterhead to: Wales-Stripit, Inc., 202 South Buell Rd., Akron, N. Y.)

### Fire Control

The three basic classes of fires are identified in a wall chart. It gives approved portable extinguishers for use on each. (Walter Kidde & Company, Inc.)

For free copy circle No. 25 on postcard

### Grinding

Grinding wheel efficiency jumps some 300 pct when made with a unique coating for abrasive grains, reports a data sheet. (Silicones Div., Union Carbide Corp.)

For free copy circle No. 26 on postcard

### Plating Services

Exceptional automatic zinc and cadmium electroplating services are outlined in a 4-page bulletin. It tells how equipment and material arriving in the morning are processed and shipped the same day.

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. 4/30/59

Circle numbers for Free Technical Literature, Design Digest, or New Equipment:

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| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
| 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
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BUSINESS REPLY CARD  
No postage necessary if mailed in the United States

POSTAGE WILL BE PAID BY

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| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
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## FREE LITERATURE

And capacity runs more than 100,000 lbs per shift. (Beilvue Plating Co.)

For free copy circle No. 27 on postcard

## Rubber Parts

An 8-page file folder presents a rubber company's facilities for producing custom-made rubber parts, seals and components. Also reviewed are laboratory facilities for developing natural, synthetic and silicone compounds. (Goshen Rubber Co., Inc.)

For free copy circle No. 28 on postcard

## Packing Steel

Ways to cut costs and improve packaging of steel appear in a folder. It highlights some very successful packing operations in steel and fabricating industries. Set-ups range from complete automation to simple strapping tools. (Signode Steel Strapping Co.)

For free copy circle No. 29 on postcard

## Muriatic Acid

Production, uses, properties and handling data on muriatic acid is contained in a 40-page brochure. A chapter deals with metal pickling. Rate of attack of muriatic acid on mild steel is figured in a graph. (Stauffer Chemical Co.)

For free copy circle No. 30 on postcard

## Analyzers

Automatic colorimetric analyzers are described in a bulletin. The industrial instruments determine trace quantities of substances dissolved in liquid process streams. (Milton Roy Co.)

For free copy circle No. 31 on postcard

## Rare Earths

Containing a price list of 12 rare earth metals is a data sheet. Prices are for delivery in ingot or lump form, and are based on actual weight shipped. Materials covered include: yttrium, lanthanum, ceri-

um, praseodymium, neodymium, samarium, gadolinium, terbium, dysprosium, holmium, erbium and ytterbium. (Research Chemical Div., Nuclear Corp. of America.)

For free copy circle No. 32 on postcard

## Wire

Coarse round, standard and special shaped wire is covered in a manual. Also reviewed are fine and specialty wire. Wire comes in many finishes, analyses and tempers in low and medium low carbon steels. (Continental Steel Corp.)

For free copy circle No. 33 on postcard

## Fork Trucks

A unique method of instant power application for fork lift trucks is featured in a company publication. The drive provides significant savings in maintenance costs. It eliminates many conventional drive-train components. (Towmotor Corp.)

For free copy circle No. 34 on postcard

## Silicone Rubber

Room temperature vulcanizing, a new silicone rubber is introduced in a bulletin. It recommends the rubber for: electrical potting and encapsulating, flexible mold-making materials, and high and low temperature sealing and caulking. (Silicone Products Dept., General Electric Co.)

For free copy circle No. 35 on postcard

## Job Shop


An 84-year-old contract service organization's newest facilities appear in a bulletin. These include up-to-date integrated engineering, toolmaking and manufacturing services. (The Taft-Peirce Mfg. Co.)

For free copy circle No. 36 on postcard

## Supervisory Equipment

Operation of new automatically programmed remote indication logging system is explained in an 8-page bulletin. The system works with space-code-selector supervisory equipment. (General Electric Co.)

For free copy circle No. 37 on postcard



GATX 71172

6067 GALS.  
SPRG. 2 1/2 IN. TRAVEL  
1W STEEL WHEELS

GATX 71172  
CAPY100000

Here is one of a fleet of forty Type 430 Stainless Steel tank cars that transport nitric acid. Built in 1956 by General American Transportation Corporation, these tank cars are still in excellent condition.

## Leading the pure life—in Stainless Steel

A manufacturer's *second* biggest disappointment is to have his product rejected because it was contaminated during shipment. The *biggest* disappointment comes when the customer buys his next order from someone else.

Manufacturers who ship or contain their products in Stainless Steel seldom worry about product purity. Many chemicals that eat away other metals have no effect on Stainless Steel. It keeps a smooth, dense surface that is easy to clean. No corrosion. No pits. No place for dirt to hide. And there's less danger of spoiling one batch with residue from another.

Because Stainless Steel is so strong, it can be used in thinner, lighter gages—reducing the overall weight of the container. But the real clincher is this: even though Stainless Steel costs more, there is no cheaper material in the long run. Specify USS Stainless Steel . . . through our nearest sales office or your local Steel Service Center.

*USS is a registered trademark*

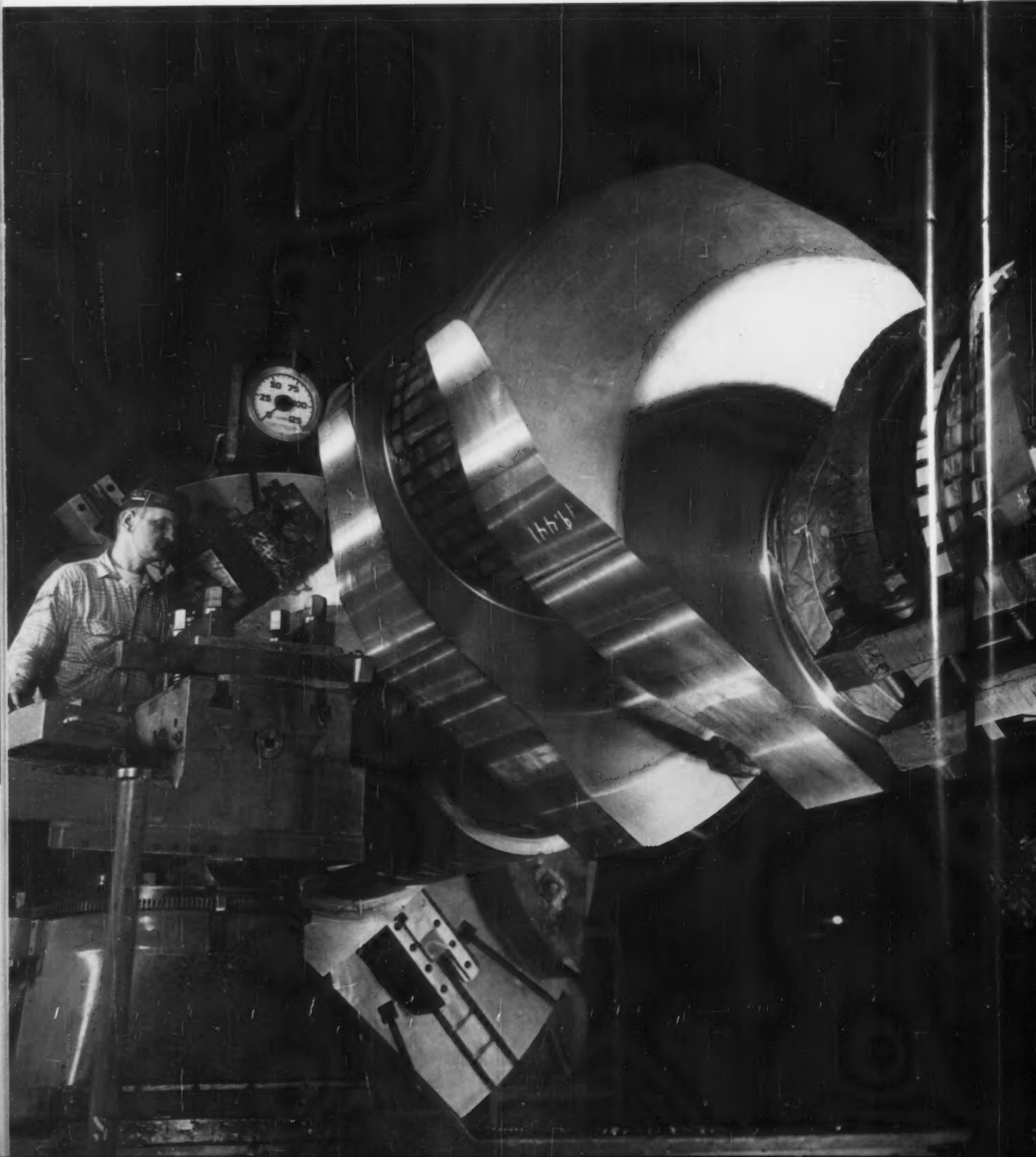
United States Steel Corporation — Pittsburgh  
American Steel & Wire — Cleveland  
National Tube — Pittsburgh  
Columbia-Geneva Steel — San Francisco  
Tennessee Coal & Iron — Fairfield, Alabama  
United States Steel Supply — Steel Service Centers  
United States Steel Export Company



**United States Steel**

**"60 tons of counterweights de-shimmied this shaft"**

says





says A. H. McGurk, USS Machine Shop Foreman



Arthur H. McGurk has supervised a lot of uncommon machining jobs during his 30 years in the Forgings Division of U. S. Steel. But even he talks about this one:

It's a 30-ton single throw crankshaft for a vertical extrusion press. The German company making the press says that it's the biggest one-piece crankshaft of its kind ever made—more than 15' long and almost 36" in diameter at the main bearing journals. The "throw" section is about 31" deep, and here, the crankpin journal is 42" in diameter.

We forged and machined this unusual shape from *one piece of steel*—a 110" diam.-476,000 # ingot of Ni-Cr-Mo-V steel that was double normalized and tempered to develop a tensile strength level of 120,000 psi. When the smooth-forged shaft was ready for machining on a 120" lathe it weighed 72 tons, and it created a real problem. As it stood, the forging couldn't be turned on the lathe because the heavy throw section was off-center from the line of the main shaft. This eccentricity would tear the shaft from the lathe.

The problem was solved with three specially designed counterweights that totaled 60 tons. Collars were welded to the weights and they were bolted to the shaft so that it could be turned on either of its two centers without any whip. On a lathe and a planer-miller, the shaft was machined to tolerances of .001".

Bearing surfaces were polished to a 63-microinch finish.

The rest of the machinery for this extrusion press was made in Germany, but U. S. Steel received the order for the crankshaft because the forging and machining demanded equipment and know-how that can't be matched anywhere else in the world. We'd appreciate your inquiries or requests for our free 32-page booklet about USS Quality Forgings. Just write United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania. *USS is a registered trademark*

United States Steel Corporation—Pittsburgh  
Columbia-Geneva Steel—San Francisco  
Tennessee Coal & Iron—Fairfield, Alabama  
United States Steel Export Company

**United States Steel**





USS "T-1" Steel can be flame-cut, welded, formed, sheared, punched, machined or forged.

## How to **beef-up** your equipment without adding fat

**Build it stronger, tougher and lighter with USS "T-1" Steel.** This remarkable steel was developed especially to meet the needs for bigger tools, stronger equipment, larger yet less massive structures.

USS "T-1" Steel is a low carbon, quenched and tempered constructional alloy steel combining weldability and formability with exceptional strength and toughness. Because of its high yield strength (100,000 psi minimum) you can cut weight safely—in actual applications, as much as 25% to 50% weight reductions have been achieved.

Total costs can frequently be reduced, too. In applications such as heavy machinery, rotating parts, pressure vessels and bridge members, steel costs can be lowered by reduction in cross section

and substantial savings experienced in welding, maintenance, freight and erection costs.

Also, in equipment subjected to impact abrasion, USS "T-1" Steel pays off. Users report service life increases ranging from 25% to 100%—or more. Power shovel buckets, bulldozer blades, coal and ore bins . . . all cost less in the end when made of "T-1" Steel because they last longer, cost less to maintain.

**Write for free book.** The many advantages, applications and cost-saving features of this versatile steel are completely described in our book USS "T-1." United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

*USS and "T-1" are registered trademarks*

United States Steel Corporation - Pittsburgh  
Columbia-Geneva Steel - San Francisco  
Tennessee Coal & Iron - Fairfield, Alabama  
United States Steel Supply - Steel Service Centers  
United States Steel Export Company



**United States Steel**

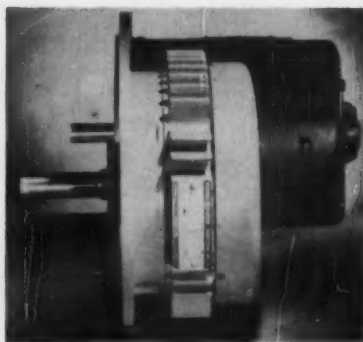
# New Materials and Components

## Thin Motor Fits Machine Tools, Fans, Blowers

Up to 55-pct shorter and 26-lbs lighter than standard NEMA Type "D" flange motors of the same rating is a new thin motor. Designed for uses in machine tools, fans, blowers, food disposers, etc., the motor gives more horsepower in less space. Its design reduces motor overhang, takes up less aisle space than standard flange-mounted mo-

tors. Thus it increases elbow room for the machine operator. And it allows more compact design of equipment such as ventilating fans. Light weight makes it easy to install on original equipment and reduces unit shipping costs. It meets NEMA design "B" specs for torques and starting. (General Electric Co.)

For more data circle No. 38 on postcard, p. 135



## Pre-assembly of Washers on Nuts Cuts Costs

Pre-assembled, this combination nut and washer comes in two new types. These are: (1) a plain dished washer fastener and (2) a conical washer unit. They're recommended for spanning bolt holes and distributing the fastener load around and away from the hole. Pre-assembly of these large washers and nuts eliminates costly separate handling of two pieces. It also assures that

there's a washer under every nut. Other types of such nuts already in use by many metalworking firms include external lock washer fasteners in a wide range of sizes, dished lock washer units, domed lock washer ones and sealing fasteners. The two new types come in sizes from No. 8 to 5/16 in. (Shakeproof Div., Illinois Tool Works.)

For more data circle No. 39 on postcard, p. 135

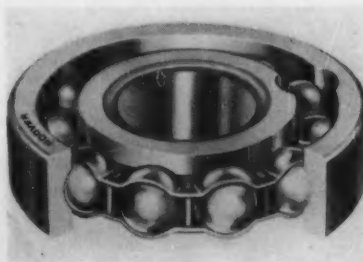


## Ball Bearing Performs Under Heavy Loads

Sustaining performance under especially heavy radial loads is a new ball bearing. It contains the "maximum number of large-size balls that can be safely inserted in the bearing," says its maker. This is done via an accurately placed filling slot. Design of the filling slot lets the

bearing also carry combined radial and thrust loads where some thrust load-carrying ability is essential. Components include extra-smooth honed raceways and perfectly matched ball sets. (Hoover Ball & Bearing Co.)

For more data circle No. 40 on postcard, p. 135

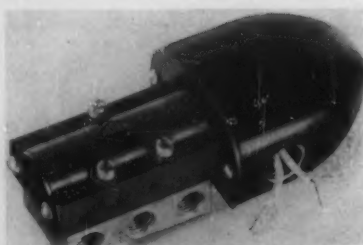


## Valves Feature Sub-base Mounting as Standard

This 1/4-in. four-way valve is sub-base mounted. It rates at 200 psi or vacuum air service. The valve body and spool have unique packless features. Precision tolerances of 0.000050 in. provide for valve assemblies with consistent sealing

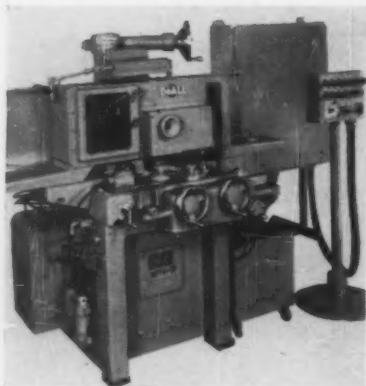
characteristics. They overcome problems inherent with packing-type valves. Special treatment in final stages of manufacture provides working areas with hard surfaces. (Alkon Products Corp.)

For more data circle No. 41 on postcard, p. 135





# New Equipment and Machinery

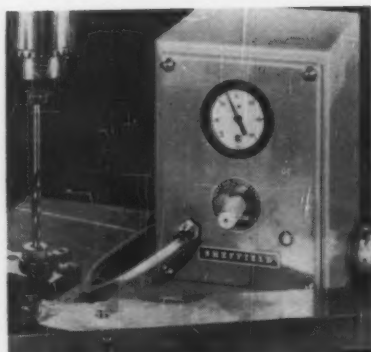


## Machine Slices Hard, Brittle Materials Easily

Although primarily for transistor production, this machine can be used wherever hard or brittle material must be sliced accurately at high output. With it, thickness of slices is limited only by cutter width and material characteristics. Index is achieved by a new cross feed mechanism of high repetitive accuracy. Also, variable speed permits exact balance of cutting factors for high performance. Cross feed com-

bins hydraulic and mechanical principles. It sets via a handwheel graduated in tenths for any automatic index from zero to 0.100 in. The automatic feature will cut as many slices throughout its 6-in. travel as wheel thickness and material permit. A built-in waterproof fluorescent light illuminates the work area. (The DoAll Co.)

For more data circle No. 42 on postcard, p. 135

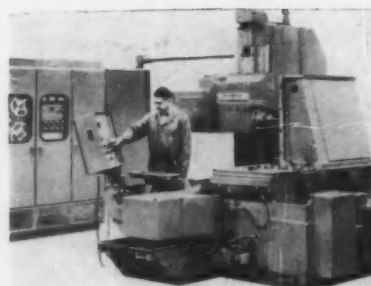


## Fingers of Air Detect Missing or Broken Drills

Multiple or single station automatic drilling machines using this pneumatic detector spot broken and missing drills with ease. The unit supplies a signal for machine shutdown. It's unaffected by dirt or coolant. In fact, the continuous jet of air blowing against the drill helps to keep the drill clean and free of chips. The unit also can detect broken reamers, taps, and other

tools. Now being used in mass-production industries, the device eliminates the need for separate probing stations. The unit detects the presence or absence of a drill or similar tool by means of a stream of air playing against each drill as the drill enters or is retracted from the workpiece. (The Sheffield Corp.)

For more data circle No. 43 on postcard, p. 135

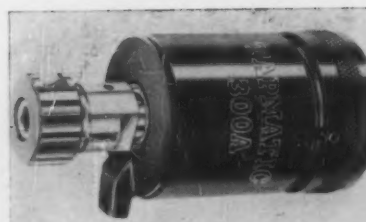


## Tape-run Machine Mills in Three Dimensions

This numerically-controlled unit continuously and automatically mills regular and irregular shapes in three dimensions. Its high degree of accuracy is under the direction of a tape-reading numerical control. The machine is the latest development stemming from Keller tracer-con-

trolled millers first introduced in 1920. In this new machine horizontal and transverse work-table movements, vertical movement of the cutter spindle, and feed rates are automatically run via punched tape. (Pratt & Whitney Co., Inc.)

For more data circle No. 44 on postcard, p. 135



## Unit Taps Continuously at Speeds to 2500 rpm

Continuously working at speeds to 2500 rpm, this attachment taps quality threads with no breakage. A semi-skilled operator can use it. It uses an axial floating drive spindle

and a spring loaded ball clutch. Tap instantly stops when dull or overloaded. Weight: 15 oz. Size: 1 27/32-in. diam by 3 3/4-in. long. (Tapmatic Corp.)

For more data circle No. 45 on postcard, p. 135



## 7 years on the pickling line Monel chains still have no "weak link"

*They resist corrosion, retain high strength, ductility*

Take a closer look at these  $\frac{5}{8}$ -inch chains of Monel\* nickel-copper alloy.

You'd never know that they've been handling two-ton loads five days a week, for seven years in a 5% sulfuric acid pickling solution at Hammond Iron Works, Bristol, Pennsylvania.

They look as good as new... have seven years pickling service behind them, *years of service ahead!*

### **Monel alloy a natural for pickling equipment**

Exceptional corrosion resistance...high strength and ductility that lasts...these are the principal reasons why Monel alloy is a natural for pickling chains...for pickling hooks, slings, tie-rods and baskets, too.

### **Add up these advantages**

1. The high strength of Monel alloy permits you to use lighter equipment to carry greater loads. It's the strongest non-ferrous metal you can use.
2. No need to allow for extra metal to offset corrosion. Monel alloy withstands sulfuric acid pickling solutions... outlasts other materials many times.
3. Equipment of Monel alloy is easily fabricated, easily repaired.

### **Get complete information**

You'll find details about Monel pickling equipment in a 32-page booklet "Equipping the Pickle House for Greater Production at Lower Cost". For your copy, just write Inco. \*Registered trademark

**THE INTERNATIONAL NICKEL COMPANY, INC.**

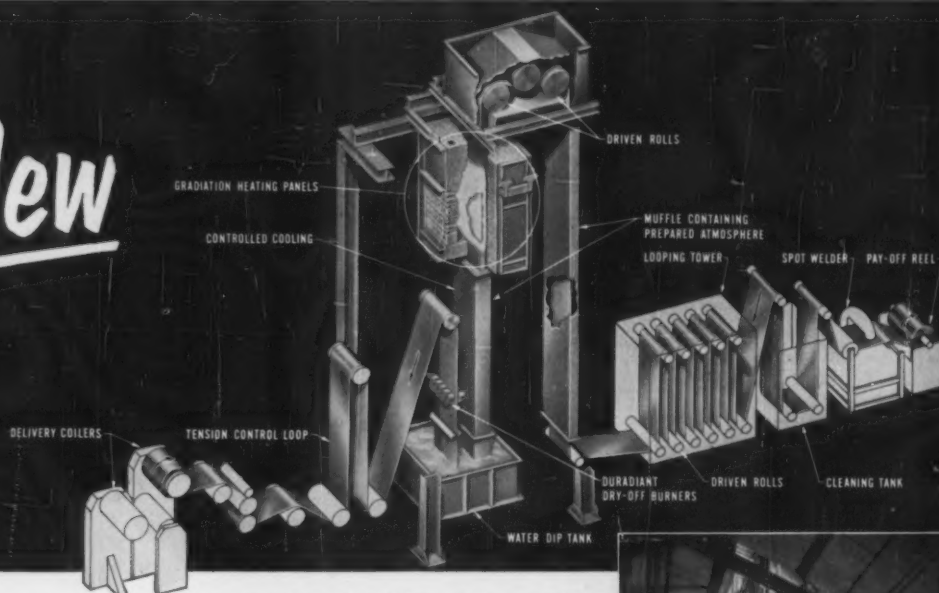
67 Wall Street

New York 5, N. Y.



# INCO NICKEL ALLOYS

# New



Heating and cooling operations—in this new vertical muffle, continuous annealing line—occupy only 10 ft linear floor space. Simple threading device, built into muffle system, permits rethreading in minutes . . . without loss of atmosphere . . . in event of tear-off of strip.

## Continuous Annealing Method Improves Quality of Stainless Steel Strip

**... achieves uniform temper, uncontaminated surface**

Selas Gradation®—used extensively as a direct-firing technique in ferrous and nonferrous strip processing—brings the same features of fast, uniform heating to operations requiring controlled atmospheres.

Stainless steel strip . . . up to 25 in. wide, as thin as 0.001 in. . . is annealed at Somers Brass Company, Waterbury, Conn., with this new Selas vertical, muffle-type furnace.

Users of this strip report improved die and tool life experienced in deep-drawing operations . . . attributed to:

- Uniformity of annealing
- Improved surface, completely devoid of surface oxide or other imperfection.

The new vertical furnace provides Somers Brass with several processing advantages over conventional horizontal muffle annealing:

- Less muffle material
- Longer muffle life
- More uniform strip temperature
- Improved atmosphere purging

Selas Gradation heating can prove beneficial to you, too. At your convenience . . . without cost or obligation to you . . . a Selas field engineer would welcome the opportunity to survey your needs.

For this personal service—or descriptive literature on Selas strip heating (please identify operation)—address Dept. 14, Selas Corporation of America, Dresher, Pa.

Gradation is a registered trade name of Selas Corporation of America.

**SELAS**  
CORPORATION OF AMERICA  
DRESHER, PENNSYLVANIA

*Heat and Fluid Processing Engineers*  
DEVELOPMENT • DESIGN • CONSTRUCTION





## The Iron Age Summary

## Mills More Bullish on Market

**Steel men are more hopeful that demand is based more on actual use than on stock building.**

**If their hopes are borne out, production could approach 1955 record of 117 million tons.**

■ Steel men are beginning to hope that the current strong market is based more on actual use than on inventory building.

More steel people are becoming convinced that the rise in Gross National Product, one of the best barometers of economic activity, is the real thing. They look for a continued rise in the second half and in 1960.

**It All Depends**—If their hopes are borne out, steel output this year could approach or even exceed record production of 117 million ingot tons in 1955. This, of course, would depend on whether there is a steel strike, and how long it might last.

At any rate, the mills are now accepting third quarter orders with more confidence than was the case earlier this year. On top of this is the knowledge that not all the steel ordered for delivery before June 30, possible strike deadline, will actually be shipped on schedule. Thus, considerable second quarter business will carry over into third quarter.

**Customer Pressure**—Meanwhile, customer pressure for delivery is growing daily as more inventories are affected by delivery carryovers. Steel users are becoming more critical now because they are consuming more steel on the one hand and taking in less than they had expected on the other.

Because of the carryover, steel users are now almost all gambling on going into a possible steel strike period with less inventory than they had been planning on as little as two weeks ago. This is particularly true of steel service centers in some areas.

**Automotive Hit**—The auto com-

panies will be among those who will have less steel on hand at the end of second quarter than they had hoped for. Some of them will be doing well if they have two months' supply, whereas they had been counting on three month's supply.

All these things add up to a basically strong steel market. Even if there is no strike, steel demand in the third quarter will decline but it will not collapse. And there could be a strong comeback in the fourth quarter.

**Ore Scare**—Some mills are beginning to worry about their iron ore stockpiles. Opening of the ore shipping season found mills with reduced stockpiles. They'll need all they can get to meet second quarter production requirements. If they are shut down by a strike, they will lose what is normally the peak of their ore shipping season. And startup of ore output at the mines after a strike normally requires at least one more week. As a result of these possibilities, the mills are straining to lay in ore.

## Steel Output, Operating Rates

| Production              | This Week | Last Week | Month Ago | Year Ago |
|-------------------------|-----------|-----------|-----------|----------|
| (Net tons, 000 omitted) | 2,689     | 2,646     | 2,646     | 1,289    |
| <b>Ingot Index</b>      |           |           |           |          |
| (1947-1949=100)         | 167.4     | 164.8     | 164.8     | 80.2     |
| <b>Operating Rates</b>  |           |           |           |          |
| Chicago                 | 96.0      | 94.0*     | 94.0      | 55.0     |
| Pittsburgh              | 97.0      | 98.0*     | 94.5      | 50.0     |
| Philadelphia            | 96.5      | 94.0      | 98.0      | 59.0     |
| Valley                  | 87.5      | 87.0*     | 88.0      | 36.0     |
| West                    | 94.0      | 93.0*     | 93.0      | 70.0     |
| Cleveland               | 99.0      | 94.0*     | 98.0      | 29.5     |
| Detroit                 | 99.0      | 98.0*     | 97.0      | 12.0     |
| Buffalo                 | 105.0     | 105.0     | 105.0     | 34.5     |
| South Ohio River        | 100.5     | 98.0      | 90.0      | 28.0     |
| South                   | 94.0      | 93.0      | 90.0      | 60.0     |
| Upper Ohio River        | 93.0      | 91.5*     | 95.5      | 62.0     |
| St. Louis               | 99.0      | 99.0*     | 85.0      | 75.0     |
| <b>Aggregate</b>        | 95.0      | 93.5      | 93.5      | 47.0     |

\*Revised

## Prices At a Glance

|                                       | This Week | Week Ago | Month Ago | Year Ago |
|---------------------------------------|-----------|----------|-----------|----------|
| (Cents per lb unless otherwise noted) |           |          |           |          |
| <b>Composite price</b>                |           |          |           |          |
| Finished Steel, base                  | 6.196     | 6.196    | 6.196     | 5.967    |
| Pig Iron (gross ton)                  | \$66.41   | \$66.41  | \$66.41   | \$66.49  |
| Scrap No. 1 hvy (Gross ton)           | \$33.83   | \$34.83  | \$37.83   | \$31.50  |
| No. 2 bundles                         | \$22.83   | \$23.17  | \$25.83   | \$22.83  |
| <b>Nonferrous</b>                     |           |          |           |          |
| Aluminum ingot                        | 26.80     | 26.80    | 26.80     | 26.10    |
| Copper, electrolytic                  | 31.50     | 31.50    | 31.50     | 25.00    |
| Lead, St. Louis                       | 11.30     | 11.30    | 11.30     | 11.80    |
| Magnesium                             | 36.00     | 36.00    | 36.00     | 36.00    |
| Nickel, electrolytic                  | 74.00     | 74.00    | 74.00     | 74.00    |
| Tin, Straits, N. Y.                   | 102.50    | 102.00   | 103.00    | 94.25    |
| Zinc, E. St. Louis                    | 11.00     | 11.00    | 11.00     | 10.00    |

# Putting Sell in Shop Equipment

**Shop equipment makers have stressed research and design departments to keep up with buyer demands.**

**Their researcher-designers are alert to customer needs, expert in the use of materials and colors.**

■ The researcher-designer is the key man in the shop equipment maker's organization these days. The customer has made this so.

The head of one leading shop equipment company says today's customer is "very alert and highly educated" to what is available in shop equipment, and what he wants.

This, and the fact that some types of shop equipment are highly competitive (more in shelving and

lockers than all-purpose benches) has forced makers to improve their lines. It has lifted the quality of the entire industry.

**Design Know-How** — Today's shop equipment designers are practiced in time and motion studies so that they can plan for maximum production efficiency. They know the effects of various color combinations in various circumstances, on various types of workers. Color is becoming more an integral part of shop equipment design.

**What's New** — The researcher must also keep an eye on developments in the technology of other materials that might make them applicable in shop equipment. Steel is still the backbone material. But aluminum and plastics are being

used more and more in trim and allied equipment.

And the researcher-designer must always keep flexibility and interchangeability in mind. Customers are now interested in equipment that can be disassembled, moved, and re-erected quickly and easily with minimum skill. One maker, for instance, Columbia-Hallowell Div., Standard Pressed Steel Co., Jenkintown, Pa., has a line of shelving called Erectomatic, that is put up with clamps and can be moved easily, and arranged in any number of patterns and sizes.

**Save Space**—And the researcher-designer must do all this with the idea of getting more into less space, and minimizing the amount of material handling required.

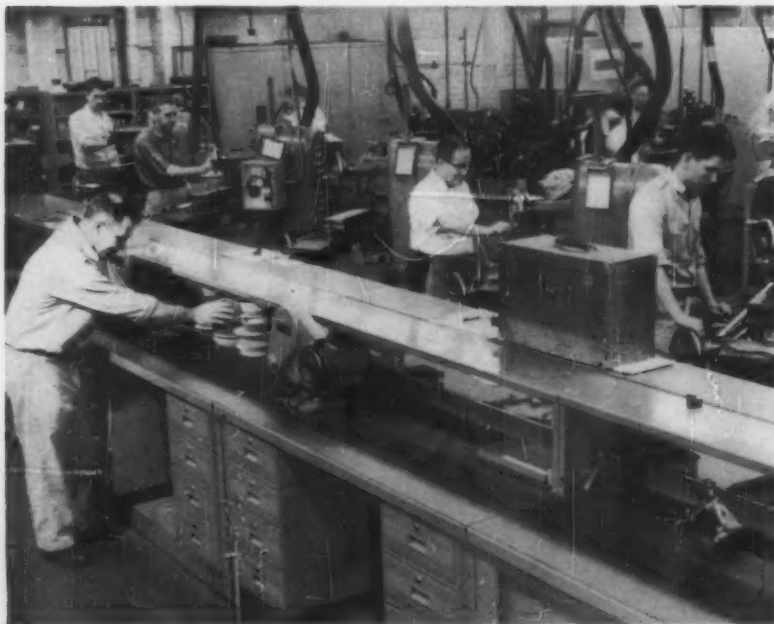
The price picture is tied very closely to steel. Most shop equipment makers have managed to hold the price line since the last steel hike. They have done this by cutting their own costs with streamlined operations and more automatic equipment.

**Price Hike**—But the consensus is they are about as far as they can go. The slightest impetus, like a higher steel price, will push up the shop equipment price.

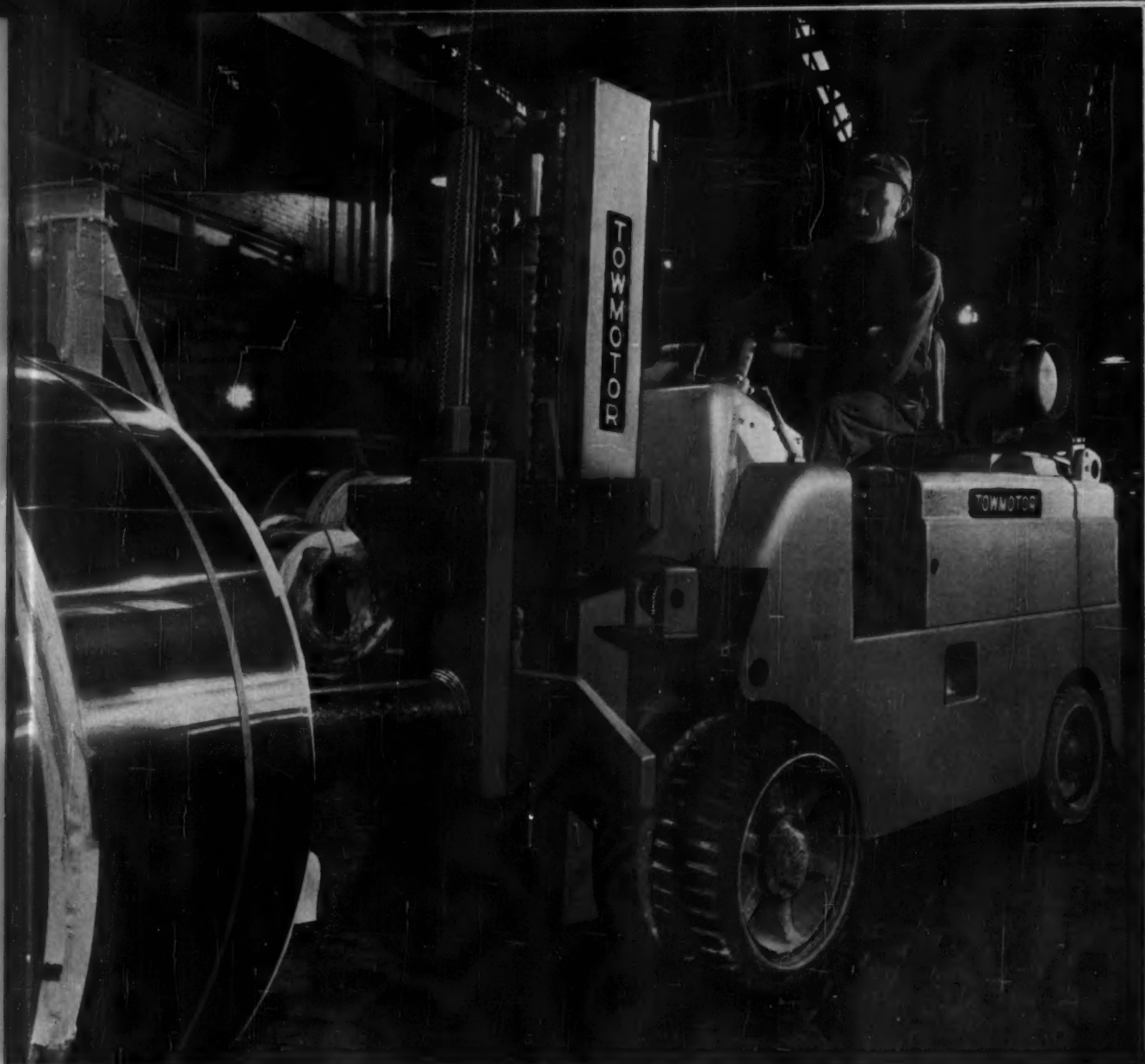
Right now things look pretty rosy for shop equipment makers. And they look good for customers also.

Business this year is running about 15 pct ahead of last year. But most shop equipment makers figured on this, so there is no bind on deliveries.

Standard items you can practically take home with you. More and more people are buying specially designed equipment.



**NO TROUBLE:** Most shop equipment makers have stocked up on steel against the possibility of a steel strike. There'll be little or no bind in this industry unless a steel strike goes longer than 60 days.



New Towmotor "Pace-Maker" Model Fork Lift Truck

## Sets pace for fast flow!

Watch agile Towmotor lift trucks keep multi-ton loads flowing through busy, congested mills and factories—and you'll know why they lead the way in materials handling. Notice the fast pace they set for *every department* as they hustle all types of materials through receiving, production and shipping.

Discover why Towmotor lift trucks have the tough-as-nails stamina for *continuous operation*—cutting handling costs to bedrock day after day. Ask for new "Pace-Maker" Booklet SP-23 . . . and Certified Job Studies applying to your specific handling operations. (Also ask about new foot-controlled *Towmostatic Drive*, available now on some Towmotor models.) Write Towmotor Corporation, Cleveland 10, Ohio.



**-GERLINGER**

LEADERS FOR 40 YEARS IN BUILDING  
FORK LIFT TRUCKS, CARRIERS AND TRACTORS

Gerlinger Carrier Co. is a subsidiary of Towmotor Corporation



# Mills Push to Meet Delivery Schedules

Sheet, strip, plate and bar are the most critical products as mills race to fill second quarter orders.

As a hedge some producers only open third quarter books part way.

■ Mill delivery problems are mushrooming as the second quarter advances. For many products (see table below) it's no longer a question of getting orders on the books. It's strictly a matter of shipping existing orders.

Even service centers are now "rationing" some products. Midwest warehouses have sheet buyers on an allotment basis. In addition, there's a heavy drain on warehouse supplies of plate and bar. Some outlets there may have trouble filling hot-rolled bar orders before the end of May.

Mills, while trying to keep cur-

rent orders moving, are accepting third quarter tonnages. Some are doing their own "hedging" against a steel strike by opening order books only part way. They are accepting orders for July and August, but not September.

Here's the reasoning: If there's a strike lasting through July, the mills will use August to clean up June carryovers and July tonnages. Then September will take care of August orders.

If there's a contract settlement without a strike, September order books will be opened as soon after July 1 as possible.

**Sheet and Strip**—Unless buyers are regular mill customers the best delivery they can expect is early July. Producers are now revising their estimates on April carryovers upward. At **Pittsburgh** backlogs on cold-rolled strip are especially bad. Practically all **Cleveland** mills are

running late on sheet shipments. Carryovers of three to four weeks are reported by **Chicago** mills. Renewed buying by automotive customers has further tightened the market there. On the **West Coast** cold-rolled sheet and strip are now on a quota basis.

**Plates and Shapes**—Sheared mill plate is generally sold out for the first half. There are a few exceptions to this general trend. One **East Coast** mill, because its linepipe mill was shut down, has some extra tonnage for June delivery. Another, whose union contract extends through July, can accept early third quarter orders and guarantee delivery.

However, plate is one of the tightest products in the **Midwest**. **Chicago** mills have large carryovers. Many mill customers there are canvassing steel service centers to fill inventory holes.

Structurals are in somewhat better supply than plates. **East Coast** mills can still accept some June orders on standards. Deliveries from **Eastern** mills are keeping the situation fluid in the **Midwest**. Wide flange beams are generally sold out, in both areas, into July.

**Wire Products**—Welded wire fabric sales are lacking in zip, as spring construction work drags in some areas. In Ohio, Pennsylvania, and Michigan, state financial troubles have held up new contract awards. As a result, orders for wire fabric and other construction products have not been as good as expected. Imports are also hurting the wire fabric market. Domestic producers are concerned that the St. Lawrence Seaway may bring in even more foreign wire products. (See story on p. 76.)

**Stainless**—All products except plate are in strong demand. Generally order books are locked up for the first half. Some third quarter orders are coming in.

Reflecting the improved market some producers—including Republic Steel's Central Alloy Div.—are offering rerolling slabs and billets to converters.

## Delivery Promises at a Glance

|                    | East    | Pittsburgh | Cleveland | Detroit | Chicago   | West Coast |
|--------------------|---------|------------|-----------|---------|-----------|------------|
| CR Carbon Sheet    | Quota   | July       | Quota     | Quota   | 10-14 wks | Quota      |
| HR Carbon Sheet    | Quota   | July       | Quota     | Quota   | 10-14 wks | Quota      |
| CR Carbon Strip    | Quota   | July       | Quota     | Quota   | 8-12 wks  | 12 wks     |
| HR Carbon Strip    | Quota   | July       | Quota     | Quota   | 8-12 wks  | 12 wks     |
| HR Carbon Bars     | Quota   | July       | Quota     | Quota   | 10-16 wks | 12 wks     |
| CF Carbon Bars     | 6-8 wks | 6-8 wks    | 6-8 wks   | Quota   | 6-10 wks  | 5 wks      |
| Heavy Plate        | Quota   | July       |           |         | 10-14 wks | Quota      |
| Light Plate        | Quota   | July       | Quota     |         | 10-12 wks | Quota      |
| Merchant Wire      | Stock   | Stock      | Stock     |         | 4-8 wks   | 4 wks      |
| Oil Country Goods  | Quota   | 4-8 wks    | 12-16 wks |         | 10-14 wks |            |
| Linepipe           | Quota   | July       | 8-12 wks  |         | 12-16 wks | 8-10 wks   |
| Buttweld Pipe      | 1-2 wks | Stock      | 4-6 wks   | Quota   | 8-12 wks  | 4 wks      |
| Std. Structurals   | 4-5 wks | 4-8 wks    |           | Quota   | 8-12 wks  | 12 wks     |
| CR Stainless Sheet | 4-5 wks | 6-8 wks    | 8-10 wks  | Quota   |           |            |
| CR Stainless Strip | 7 wks   | 8-10 wks   | 8-10 wks  | Quota   |           |            |

# COMPARISON OF PRICES

(Effective April 28, 1959)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland and Youngstown.

Price advances over previous week are printed in **Heavy Type**; declines appear in *Italics*.

|  | Apr. 28<br>1959 | Apr. 21<br>1959 | Mar. 31<br>1959 | Apr. 29<br>1958 |
|--|-----------------|-----------------|-----------------|-----------------|
| <b>Flat-Rolled Steel: (per pound)</b>        |                 |                 |                 |                 |
| Hot-rolled sheets                            | 5.10¢           | 5.10¢           | 5.10¢           | 4.925¢          |
| Cold-rolled sheets                           | 6.275           | 6.275           | 6.275           | 6.05            |
| Galvanized sheets (10 ga.)                   | 6.875           | 6.875           | 6.875           | 6.60            |
| Hot-rolled strip                             | 5.10            | 5.10            | 5.10            | 4.925           |
| Cold-rolled strip                            | 7.425           | 7.425           | 7.425           | 7.17            |
| Plate  | 5.30            | 5.30            | 5.30            | 5.12            |
| Plates, wrought iron                         | 13.55           | 13.55           | 13.55           | 13.15           |
| Stainl's C-R strip (No. 302)                 | 52.00           | 52.00           | 52.00           | 52.00           |
| <b>Tin and Terneplate: (per base box)</b>    |                 |                 |                 |                 |
| Tinplate (1.50 lb.) cokes                    | \$10.65         | \$10.65         | \$10.65         | \$10.30         |
| Tin plates, electro (0.50 lb.)               | 9.35            | 9.35            | 9.35            | 9.00            |
| Special coated mfg. ternes                   | 9.90            | 9.90            | 9.90            | 9.55            |
| <b>Bars and Shapes: (per pound)</b>          |                 |                 |                 |                 |
| Merchant bar                                 | 5.675¢          | 6.675¢          | 5.675¢          | 5.425¢          |
| Cold finished bar                            | 7.65            | 7.65            | 7.65            | 7.30            |
| Alloy bars                                   | 6.725           | 6.725           | 6.725           | 6.475           |
| Structural shapes                            | 5.50            | 5.50            | 5.50            | 5.275           |
| Stainless bars (No. 302)                     | 46.75           | 46.75           | 45.00           | 45.00           |
| Wrought iron bars                            | 14.90           | 14.90           | 14.90           | 14.45           |
| <b>Wire: (per pound)</b>                     |                 |                 |                 |                 |
| Bright wire                                  | 8.00¢           | 8.00¢           | 8.00¢           | 7.65¢           |
| <b>Rails: (per 100 lb.)</b>                  |                 |                 |                 |                 |
| Heavy rails                                  | \$5.75          | \$5.75          | \$5.75          | \$5.525         |
| Light rails                                  | 6.725           | 6.725           | 6.725           | 6.50            |
| <b>Semifinished Steel: (per net ton)</b>     |                 |                 |                 |                 |
| Revoling billets                             | \$80.00         | \$80.00         | \$80.00         | \$77.50         |
| Slabs, revoling                              | 80.00           | 80.00           | 80.00           | 77.50           |
| Forging billets                              | 99.50           | 99.50           | 99.50           | 96.00           |
| Alloys blooms, billets, slabs                | 119.00          | 119.00          | 119.00          | 114.00          |
| <b>Wire Rods and Skelp: (per pound)</b>      |                 |                 |                 |                 |
| Wire rods                                    | 6.40¢           | 6.40¢           | 6.40¢           | 6.15¢           |
| Skelp  | 5.05            | 5.05            | 5.05            | 4.875           |
| <b>Finished Steel Composite: (per pound)</b> |                 |                 |                 |                 |
| Base price                                   | 6.196¢          | 6.196¢          | 6.196¢          | 5.967¢          |

## Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

## Pig Iron Composite

Based on averages for basic iron at Valley Furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

## Steel Scrap Composites

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

|   | Apr. 28<br>1959 | Apr. 21<br>1959 | Mar. 31<br>1959 | Apr. 29<br>1958 |
|---|-----------------|-----------------|-----------------|-----------------|
| <b>Pig Iron: (per gross ton)</b>                            |                 |                 |                 |                 |
| Foundry, del'd Phila.                                       | \$70.87         | \$70.87         | \$70.87         | \$70.97         |
| Foundry, Southern Cin'ti                                    | 73.87           | 73.87           | 73.87           | 73.87           |
| Foundry, Birmingham   | 62.50           | 62.50           | 62.50           | 62.50           |
| Foundry, Chicago  | 66.50           | 66.50           | 66.50           | 66.50           |
| Basic, del'd Philadelphia                                   | 70.07           | 70.07           | 70.07           | 70.47           |
| Basic, Valley furnace                                       | 66.00           | 66.00           | 66.00           | 66.00           |
| Malleable, Chicago  | 66.50           | 66.50           | 66.50           | 66.50           |
| Malleable, Valley   | 66.50           | 66.50           | 66.50           | 66.50           |
| Ferromanganese, 74-76 pct Mn, cents per lb                  | 12.25           | 12.25           | 12.25           | 12.25           |
| <b>Pig Iron Composite: (per gross ton)</b>                  |                 |                 |                 |                 |
| Pig iron  | \$66.41         | \$66.41         | \$66.41         | \$66.49         |
| <b>Scrap: (per gross ton)</b>                               |                 |                 |                 |                 |
| No. 1 steel, Pittsburgh                                     | \$35.50         | \$38.50         | \$41.50         | \$32.50         |
| No. 1 steel, Phila. area                                    | 33.50           | 33.50           | 35.50           | 34.50           |
| No. 1 steel, Chicago  | 32.50           | 32.50           | 36.50           | 27.50           |
| No. 1 bundles, Detroit                                      | 29.50           | 31.50           | 32.50           | 21.50           |
| Low phos., Youngstown                                       | 38.50           | 38.00           | 43.50           | 32.50           |
| No. 1 mach'y cast, Pittsburgh                               | 49.50           | 49.50           | 49.50           | 48.50           |
| No. 1 mach'y cast, Phila.                                   | 49.50           | 49.50           | 49.50           | 47.50           |
| No. 1 mach'y cast, Chicago                                  | 52.50           | 51.50           | 54.50           | 41.50           |
| <b>Steel Scrap Composite: (per gross ton)</b>               |                 |                 |                 |                 |
| No. 1 hvy. melting scrap                                    | \$33.83         | \$34.83         | \$37.83         | \$31.50         |
| No. 2 bundles   | 22.83           | 23.17           | 25.83           | 22.83           |
| <b>Coke, Connellsville: (per net ton at oven)</b>           |                 |                 |                 |                 |
| Furnace coke, prompt  | \$14.50-15.50   | \$14.50-15.50   | \$14.50-15.50   | \$15.38         |
| Foundry Coke, prompt  | 18.50           | 18.50           | 18.50           | 17.50-19        |
| <b>Nonferrous Metals: (cents per pound to large buyers)</b> |                 |                 |                 |                 |
| Copper, electrolytic, Conn.                                 | 31.50           | 31.50           | 31.50           | 25.00           |
| Copper, Lake, Conn.   | 31.50           | 31.50           | 31.50           | 25.00           |
| Tin, Straits, N. Y.   | 102.50†         | 102.00          | 103.00          | 94.25           |
| Zinc, East St. Louis  | 11.00           | 11.00           | 11.00           | 10.00           |
| Lead, St. Louis   | 11.30           | 11.30           | 11.30           | 11.80           |
| Aluminum, virgin ingot                                      | 26.80           | 26.80           | 26.80           | 26.10           |
| Nickel, electrolytic  | 74.00           | 74.00           | 74.00           | 74.00           |
| Magnesium, ingot  | 36.00           | 36.00           | 36.00           | 36.00           |
| Antimony, Laredo, Tex.                                      | 29.50           | 29.50           | 29.50           | 29.50           |

† Tentative. ‡ Average. \* Revised.

## INDEX TO PRICE PAGES

|                             |             |
|-----------------------------|-------------|
| Prices At a Glance          | 145         |
| Comparison of Prices        | 149         |
| Bars                        | 159         |
| Billets, Blooms and Slabs   | 157         |
| Boiler Tubes                | 161         |
| Bolts, Nuts, Rivets, Screws | 162         |
| Clad Steel                  | 161         |
| Coke                        | 161         |
| Electrical Sheets           | 161         |
| Electrodes                  | 161         |
| Electroplating Supplies     | 162         |
| Ferroalloys                 | 164         |
| Iron Ore                    | 162         |
| Merchant Wire Products      | 161         |
| Metal Powders               | 162         |
| Nonferrous                  |             |
| Mill Products               | 156         |
| Primary Prices              | 149-154-156 |
| Remelted Metals             | 156         |
| Scrap                       | 156         |
| Piling                      | 157         |
| Pig Iron                    | 163         |
| Pipe and Tubing             | 160         |
| Plates                      | 159         |
| Rails                       | 161         |
| Refractories                | 161         |
| Service Center Prices       | 162         |
| Shapes                      | 157         |
| Sheets                      | 158         |
| Spring Steel                | 161         |
| Stainless                   | 163         |
| Steel Scrap                 | 152         |
| Strip                       | 157         |
| Structurals                 | 157         |
| Tinplate                    | 158         |
| Tool Steel                  | 161         |
| Track Supplies              | 161         |
| Water Pipe Index            | 162         |
| Wire                        | 159         |
| Wire Rod                    | 158         |

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## Factory Lists Bring Lower Prices

**New sales of industrial scrap at lower prices further weakens the dealer market.**

**Dealer scrap sources are drying up. But there is some revival in export activity.**

■ The flicker of strength in the market last week has been snuffed out.

Openhearth scrap prices in Pittsburgh plunged from \$1 to \$3 based on new purchases of industrial lists.

In Detroit, sales of auto lists at lower prices dragged the dealer market there down an average of \$2.

Prices in other districts are teetering on the brink of another drop as mills begin reducing scrap inventories in readiness for a possible steel strike this summer. The bottom of the market may still be a few dollars away.

Scrap sources are starting to dry up. Dealers, wary of speculating, are turning away all but the best material offered by collectors. Turnings and No. 2 dealer bundles particularly are going begging.

But there is one cheerful note. Low prices have stirred some export buyers into action. In the ports of Philadelphia and Birmingham, there was more export activity this week than there has been for some time. What little movement of material there is in New York and the West Coast is due to export. And prospects are good for new foreign orders during May.

Based on a \$3 drop in Pittsburgh, The IRON AGE No. 1 heavy melting Composite Price fell \$1 to \$33.83.

**Pittsburgh** — Scrap prices broke sharply downward this week as industrial lists sagged and mills continued to buy only limited tonnages of dealer grades. A local consumer bought No. 2 bundles at \$26 for a drop of \$1. Other openhearth grades fell \$1 to \$3. With the mills holding inventories down, scrap men see little hope of heavy buying between now and the end of June. This prospect has deterred speculative buying and widened the spreads between unprepared and prepared grades.

**Chicago** — Despite several small purchases by district mills in the past week, the market continued to drift sideways. An increasing number of dealers seem to be willing to sit out a possible steel strike. Result: The available scrap supply is shrinking. Cast iron car wheels were incorrectly quoted last week. Correct price was \$38-\$39.

**Philadelphia** — A sudden revival of export business offers some hope for the market, at least during the next month. One buyer released scrap for export on old orders. Prospects are for two or three new cargoes in May. Domestic mills are not buying. Prices are unchanged.

**New York** — Only a trickle of scrap is moving here. Small export tonnages account for most of it. But dealers and brokers so far appear able to command going prices for material when orders exist. Prices may have found a temporary floor.

**Detroit** — Prospects for dealer scrap are weakening fast. A small list, 25 cars, of industrial bundles sold last week for slightly more than

\$34. This was about \$4.50 less than April list averages. Indications are that a large list closing this week will be off even further.

**Cleveland** — Prices firmed a bit as early auto lists sold at quoted levels. Some mills are beginning to become interested in the bargains. But so far, interest has been restricted to small lots. Several Valley mills bought from specified yards at \$38 for industrial tonnage. Others are waiting to see the pattern established by auto lists. Machine shop turnings were incorrectly quoted in Youngstown last week. Correct price was \$18-\$19.

**St. Louis** — The scrap steel market here again was quiet and a little easier in spots. However, cast grades were fairly active. Turnings, rails, angles and splice bars, stove plate, and cast iron car wheels all are down \$1.

**Birmingham** — Prices here are unchanged. Some mills are still buying scrap at previously-established levels but dealers are resisting attempts at further price cuts.

**Cincinnati** — Local market is somewhat weaker. One mill is on a pre-strike scrap inventory reduction program but another is continuing its normal program. If prices decline further, scrap sources are expected to start drying up.

**Buffalo** — Inactivity settled over this market after a mid-month sale. Prices are unchanged. The season's first shipload of scrap was unloaded last week. Some feel this will tend to weaken prices further.

**Boston** — The market is very weak. Price of No. 2 bundles dropped \$1 on appraisal.

**West Coast** — Prices are unchanged, but the market along the entire coast is dragging. Whatever strength there is here is due to export activity.

**Houston** — The market is slow and the outlook is dim. The district mill has taken in all the scrap it needs until at least June 15.



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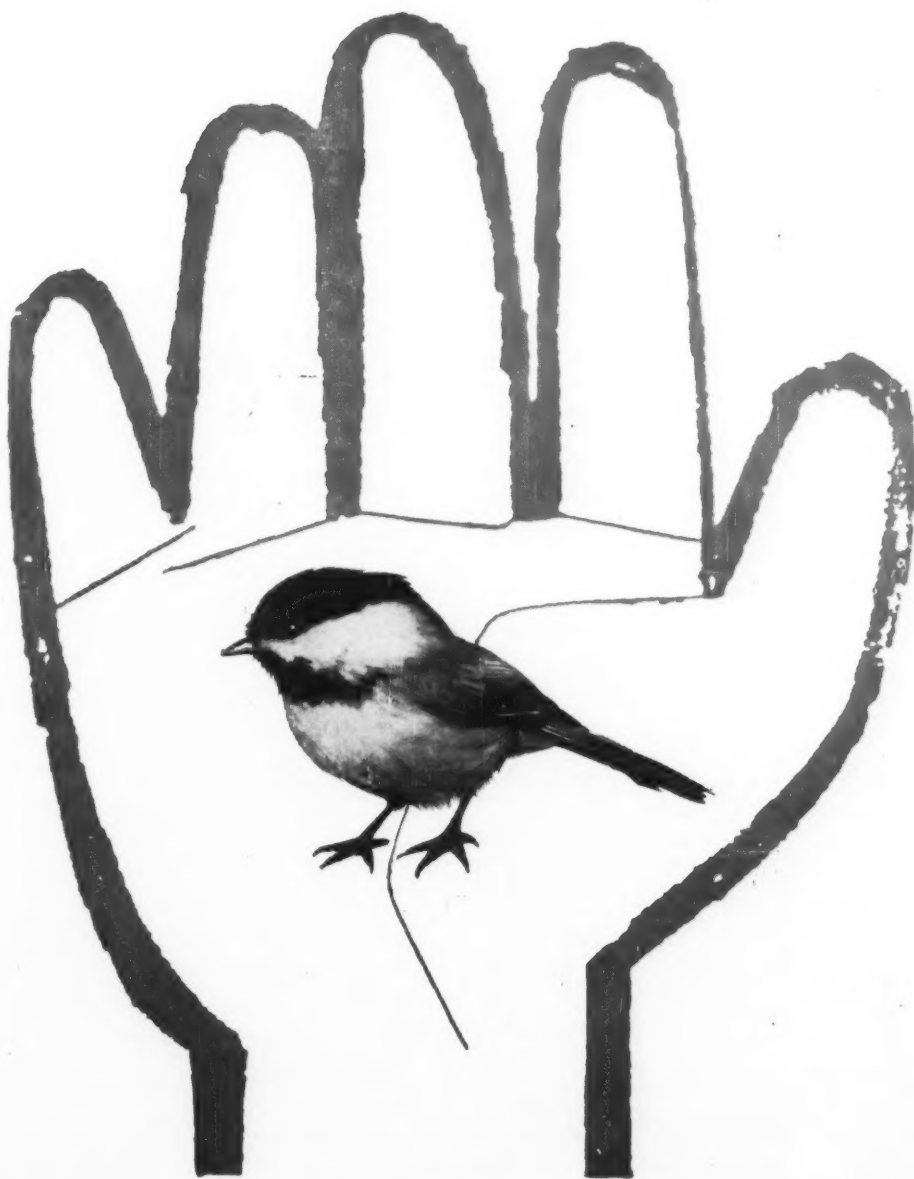
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\*Based on Manufacturing Corporation Statistics for the first half of 1958.

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# SCRAP PRICES (Effective April 28, 1959)

## Pittsburgh

|                           |                    |
|---------------------------|--------------------|
| No. 1 hvy. melting        | \$35.00 to \$36.00 |
| No. 2 hvy. melting        | 27.00 to 28.00     |
| No. 1 dealer bundles      | 39.00 to 40.00     |
| No. 1 factory bundles     | 43.00 to 44.00     |
| No. 2 bundles             | 25.00 to 26.00     |
| No. 1 busheling           | 38.00 to 39.00     |
| Machine shop turn.        | 19.00 to 20.00     |
| Shoveling turnings        | 26.00 to 27.00     |
| Cast iron borings         | 25.00 to 26.00     |
| Low phos. punch'gs plate  | 43.00 to 44.00     |
| Heavy turnings            | 28.00 to 29.00     |
| No. 1 RR hvy. melting     | 38.00 to 39.00     |
| Scrap rails, random lgth. | 50.00 to 51.00     |
| Rails 2 ft and under      | 54.00 to 55.00     |
| RR specialties            | 44.00 to 45.00     |
| No. 1 machinery cast.     | 49.00 to 50.00     |
| Cupola cast.              | 45.00 to 46.00     |
| Heavy breakable cast.     | 43.00 to 44.00     |
| Stainless                 |                    |
| 18-8 bundles and solids   | 230.00 to 235.00   |
| 18-8 turnings             | 115.00 to 120.00   |
| 430 bundles and solids    | 130.00 to 135.00   |
| 410 turnings              | 55.00 to 60.00     |

## Chicago

|                           |                    |
|---------------------------|--------------------|
| No. 1 hvy. melting        | \$32.00 to \$33.00 |
| No. 2 hvy. melting        | 28.00 to 29.00     |
| No. 1 dealer bundles      | 32.00 to 33.00     |
| No. 1 factory bundles     | 37.00 to 38.00     |
| No. 2 bundles             | 21.00 to 22.00     |
| No. 1 busheling           | 32.00 to 33.00     |
| Machine shop turn.        | 15.00 to 16.00     |
| Mixed bor. and turn.      | 17.00 to 18.00     |
| Shoveling turnings        | 17.00 to 18.00     |
| Cast iron borings         | 17.00 to 18.00     |
| Low phos. forge crops     | 44.00 to 45.00     |
| Low phos. punch'gs plate  |                    |
| 1/4 in. and heavier       | 41.00 to 42.00     |
| Low phos. 2 ft and under  | 39.00 to 40.00     |
| No. 1 RR hvy. melting     | 37.00 to 38.00     |
| Scrap rails, random lgth. | 43.00 to 44.00     |
| Rerolling rails           | 55.00 to 56.00     |
| Rails 2 ft and under      | 51.00 to 52.00     |
| Angles and splice bars    | 46.00 to 47.00     |
| RR steel car axles        | 63.00 to 64.00     |
| RR couplers and knuckles  | 44.00 to 45.00     |
| No. 1 machinery cast.     | 52.00 to 53.00     |
| Cupola cast.              | 45.00 to 46.00     |
| Cast iron wheels          | 38.00 to 39.00     |
| Malleable                 | 54.00 to 55.00     |
| Stove plate               | 43.00 to 44.00     |
| Steel car wheels          | 42.00 to 43.00     |
| Stainless                 |                    |
| 18-8 bundles and solids   | 220.00 to 225.00   |
| 18-8 turnings             | 120.00 to 125.00   |
| 430 bundles and solids    | 115.00 to 120.00   |
| 430 turnings              | 55.00 to 60.00     |

## Philadelphia Area

|                           |                    |
|---------------------------|--------------------|
| No. 1 hvy. melting        | \$33.00 to \$34.00 |
| No. 2 hvy. melting        | 27.00 to 28.00     |
| No. 1 dealer bundles      | 36.00 to 37.00     |
| No. 2 bundles             | 21.00 to 22.00     |
| No. 1 busheling           | 35.00 to 36.00     |
| Machine shop turn.        | 17.00 to 19.00     |
| Mixed bor. short turn.    | 17.00 to 19.00     |
| Cast iron borings         | 17.00 to 19.00     |
| Shoveling turnings        | 23.00 to 24.00     |
| Clean cast. chem. borings | 30.00 to 31.00     |
| Low phos. 5 ft and under  | 39.00 to 40.00     |
| Low phos. 2 ft punch'gs   | 41.00 to 42.00     |
| Elec. furnace bundles     | 38.00 to 39.00     |
| Heavy turnings            | 32.00 to 33.00     |
| RR specialties            | 42.00 to 43.00     |
| Rails 18 in. and under    | 58.00 to 60.00     |
| Cupola cast.              | 40.00 to 41.00     |
| Heavy breakable cast.     | 42.00 to 43.00     |
| Cast iron car wheels      | 44.00 to 45.00     |
| Malleable                 | 67.00 to 68.00     |
| No. 1 machinery cast.     | 49.00 to 50.00     |

## Cincinnati

|  |                    |
|--|--------------------|
| Brokers buying prices per gross ton on cars: |                    |
| No. 1 hvy. melting                           | \$34.00 to \$35.00 |
| No. 2 hvy. melting                           | 27.50 to 28.50     |
| No. 1 dealer bundles                         | 34.00 to 35.00     |
| No. 2 bundles                                | 21.00 to 22.00     |
| Machine shop turn.                           | 15.00 to 16.00     |
| Shoveling turnings                           | 17.00 to 18.00     |
| Cast iron borings                            | 17.00 to 18.00     |
| Low phos. 18 in. and under                   | 40.00 to 41.00     |
| Rails, random length                         | 47.00 to 48.00     |
| Rails, 18 in. and under                      | 54.00 to 55.00     |
| No. 1 cupola cast.                           | 43.00 to 44.00     |
| Hvy. breakable cast.                         | 40.00 to 41.00     |
| Drop broken cast.                            | 48.00 to 49.00     |

## Youngstown

|                      |                    |
|----------------------|--------------------|
| No. 1 hvy. melting   | \$36.50 to \$37.50 |
| No. 2 hvy. melting   | 30.50 to 31.50     |
| No. 1 dealer bundles | 36.50 to 37.50     |
| No. 2 bundles        | 21.50 to 22.50     |
| Machine shop turn.   | 18.00 to 19.00     |
| Shoveling turnings   | 22.00 to 23.00     |
| Low phos. plate      | 38.00 to 39.00     |

## Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

## Cleveland

|                                       |                    |
|---------------------------------------|--------------------|
| No. 1 hvy. melting                    | \$33.00 to \$34.00 |
| No. 2 hvy. melting                    | 27.00 to 28.00     |
| No. 1 dealer bundles                  | 33.00 to 34.00     |
| No. 1 factory bundles                 | 38.00 to 39.00     |
| No. 2 bundles                         | 19.00 to 20.00     |
| No. 1 busheling                       | 33.00 to 34.00     |
| Machine shop turn.                    | 15.00 to 16.00     |
| Mixed bor. and turn.                  | 20.00 to 21.00     |
| Shoveling turnings                    | 20.00 to 21.00     |
| Cast iron borings                     | 20.00 to 21.00     |
| Cut structural & plates, 2 ft & under | 40.00 to 41.00     |
| Drop forge flashings                  | 33.00 to 34.00     |
| Low phos. punch'gs plate              | 34.00 to 35.00     |
| Foundry steel, 2 ft & under           | 35.00 to 36.00     |
| No. 1 RR hvy. melting                 | 38.00 to 39.00     |
| Rails 2 ft and under                  | 56.00 to 57.00     |
| Rails 18 in. and under                | 57.00 to 58.00     |
| Steel axle turnings                   | 24.00 to 25.00     |
| Railroad cast.                        | 53.00 to 54.00     |
| No. 1 machinery cast.                 | 51.00 to 52.00     |
| Stove plate                           | 48.00 to 49.00     |
| Malleable                             | 66.00 to 67.00     |
| Stainless                             |                    |
| 18-8 bundles                          | 210.00 to 220.00   |
| 18-8 turnings                         | 115.00 to 120.00   |
| 430 bundles                           | 120.00 to 125.00   |

## Buffalo

|                                       |                    |
|---------------------------------------|--------------------|
| No. 1 hvy. melting                    | \$32.00 to \$33.00 |
| No. 2 hvy. melting                    | 27.00 to 28.00     |
| No. 1 busheling                       | 32.00 to 33.00     |
| No. 1 dealer bundles                  | 32.00 to 33.00     |
| No. 2 bundles                         | 22.00 to 23.00     |
| Machine shop turn.                    | 16.00 to 17.00     |
| Mixed bor. and turn.                  | 18.00 to 19.00     |
| Shoveling turnings                    | 20.00 to 21.00     |
| Cast iron borings                     | 17.00 to 18.00     |
| Low phos. plate                       | 37.00 to 38.00     |
| Structurals and plate, 2 ft and under | 41.00 to 42.00     |
| Scrap rails, random lgth.             | 39.00 to 40.00     |
| Rails 2 ft and under                  | 49.00 to 50.00     |
| No. 1 machinery cast.                 | 50.00 to 51.00     |
| No. 1 cupola cast.                    | 46.00 to 47.00     |

## St. Louis

|                         |                    |
|-------------------------|--------------------|
| No. 1 hvy. melting      | \$33.00 to \$34.00 |
| No. 2 hvy. melting      | 31.00 to 32.00     |
| No. 1 dealer bundles    | 37.00 to 38.00     |
| No. 2 bundles           | 23.00 to 24.00     |
| Machine shop turn.      | 13.00 to 14.00     |
| Shoveling turnings      | 15.00 to 16.00     |
| Cast iron borings       | 19.00 to 20.00     |
| No. 1 RR hvy. melting   | 38.00 to 39.00     |
| Rails, random lengths   | 45.00 to 46.00     |
| Rails, 18 in. and under | 49.00 to 50.00     |
| Angles and splice bars  | 44.00 to 45.00     |
| RR specialties          | 42.00 to 43.00     |
| Cupola cast.            | 49.00 to 50.00     |
| Heavy breakable cast.   | 40.00 to 41.00     |
| Cast iron brake shoes   | 37.00 to 38.00     |
| Stove plate             | 43.50 to 44.50     |
| Cast iron car wheels    | 40.00 to 41.00     |
| Rerolling rails         | 56.00 to 57.00     |
| Unstripped motor blocks | 41.00 to 42.00     |

## Birmingham

|                             |                    |
|-----------------------------|--------------------|
| No. 1 hvy. melting          | \$30.00 to \$31.00 |
| No. 2 hvy. melting          | 25.00 to 26.00     |
| No. 1 dealer bundles        | 30.00 to 31.00     |
| No. 2 bundles               | 21.00 to 22.00     |
| No. 1 busheling             | 30.00 to 31.00     |
| Machine shop turn.          | 22.00 to 23.00     |
| Shoveling turnings          | 23.00 to 24.00     |
| Cast iron borings           | 14.00 to 15.00     |
| Electric furnace bundles    | 36.00 to 37.00     |
| Elec. furnace, 3 ft & under | 33.00 to 34.00     |
| Bar crops and plate         | 40.00 to 41.00     |
| Structural and plate, 2 ft. | 39.00 to 40.00     |
| No. 1 RR hvy. melting       | 33.00 to 34.00     |
| Scrap rails, random lgth.   | 41.00 to 42.00     |
| Rails, 18 in. and under     | 49.00 to 50.00     |
| Angles and splice bars      | 43.00 to 44.00     |
| Rerolling rails             | 52.00 to 53.00     |
| No. 1 cupola cast.          | 53.00 to 54.00     |
| Stove plate                 | 53.00 to 54.00     |
| Cast iron car wheels        | 39.00 to 40.00     |
| Unstripped motor blocks     | 40.00 to 41.00     |

## New York

|  |                    |
|--|--------------------|
| Brokers buying prices per gross ton on cars: |                    |
| No. 1 hvy. melting                           | \$26.00 to \$27.00 |
| No. 2 hvy. melting                           | 21.00 to 22.00     |
| No. 2 dealer bundles                         | 16.00 to 17.00     |
| Machine shop turnings                        | 9.00 to 10.00      |
| Mixed bor. and turn.                         | 12.00 to 13.00     |
| Shoveling turnings                           | 14.00 to 15.00     |
| Clean chem. cast. borings                    | 23.00 to 25.00     |
| No. 1 machinery cast.                        | 37.00 to 38.00     |
| Mixed yard cast.                             | 35.00 to 36.00     |
| Heavy breakable cast.                        | 33.00 to 34.00     |
| Stainless                                    |                    |
| 18-8 prepared solids                         | 195.00 to 200.00   |
| 18-8 turnings                                | 85.00 to 90.00     |
| 430 prepared solids                          | 85.00 to 90.00     |
| 430 turnings                                 | 20.00 to 25.00     |

## Detroit

|  |                    |
|--|--------------------|
| Brokers buying prices per gross ton on cars: |                    |
| No. 1 hvy. melting                           | \$27.00 to \$28.00 |
| No. 2 hvy. melting                           | 18.00 to 19.00     |
| No. 1 dealer bundles                         | 29.00 to 30.00     |
| No. 2 bundles                                | 15.00 to 16.00     |
| No. 1 busheling                              | 27.00 to 28.00     |
| Drop forge flashings                         | 26.00 to 27.00     |
| Machine shop turn.                           | 10.00 to 11.00     |
| Mixed bor. and turn.                         | 11.00 to 12.00     |
| Shoveling turnings                           | 12.00 to 13.00     |
| Cast iron borings                            | 11.00 to 12.00     |
| Heavy breakable cast.                        | 31.00 to 32.00     |
| Mixed cupola cast.                           | 40.00 to 41.00     |
| Automotive cast.                             | 36.00 to 47.00     |
| Stainless                                    |                    |
| 18-8 bundles and solids                      | 210.00 to 215.00   |
| 18-8 turnings                                | 100.00 to 105.00   |
| 430 bundles and solids                       | 100.00 to 105.00   |

## Boston

|  |                    |
|--|--------------------|
| Brokers buying prices per gross ton on cars: |                    |
| No. 1 hvy. melting                           | \$24.00 to \$25.00 |
| No. 2 hvy. melting                           | 20.00 to 21.00     |
| No. 1 dealer bundles                         | 24.00 to 25.00     |
| No. 2 bundles                                | 16.00 to 17.00     |
| No. 1 busheling                              | 24.00 to 25.00     |
| Machine shop turn.                           | 7.00 to 8.00       |
| Shoveling turnings                           | 11.00 to 12.00     |
| Clean cast. chem. borings                    | 16.00 to 17.00     |
| No. 1 machinery cast.                        | 33.00 to 34.00     |
| Mixed cupola cast.                           | 33.00 to 34.00     |
| Heavy breakable cast.                        | 31.00 to 32.00     |
| Stove plate                                  | 29.00 to 30.00     |

## San Francisco

|                      |                  |
|----------------------|------------------|
| No. 1 hvy. melting   | \$36.00          |
| No. 2 hvy. melting   | 33.00            |
| No. 1 dealer bundles | \$32.00 to 34.00 |
| No. 2 bundles        | 22.00            |
| Machine shop turn.   | 17.00            |
| Cast iron borings    | 17.00            |
| No. 1 cupola cast.   | 45.00            |

## Los Angeles

|                                      |                  |
|--------------------------------------|------------------|
| No. 1 hvy. melting                   | \$38.00          |
| No. 2 hvy. melting                   | 36.00            |
| No. 1 dealer bundles                 | 35.00            |
| No. 2 bundles                        | 18.00            |
| Machine shop turn.                   | \$16.00 to 17.00 |
| Shoveling turnings                   | 18.00 to 19.00   |
| Cast iron borings                    | 18.00 to 19.00   |
| Elec. furn. 1 ft and under (foundry) | 49.00            |
| No. 1 cupola cast.                   | 45.00            |

## Seattle

|                    |         |
|--------------------|---------|
| No. 1 hvy. melting | \$35.00 |
| No. 2 hvy. melting | 33.00   |
| No. 2 bundles      | 22.00   |
| No. 1 cupola cast. | 36.00   |
| Mixed yard cast.   | 36.00   |

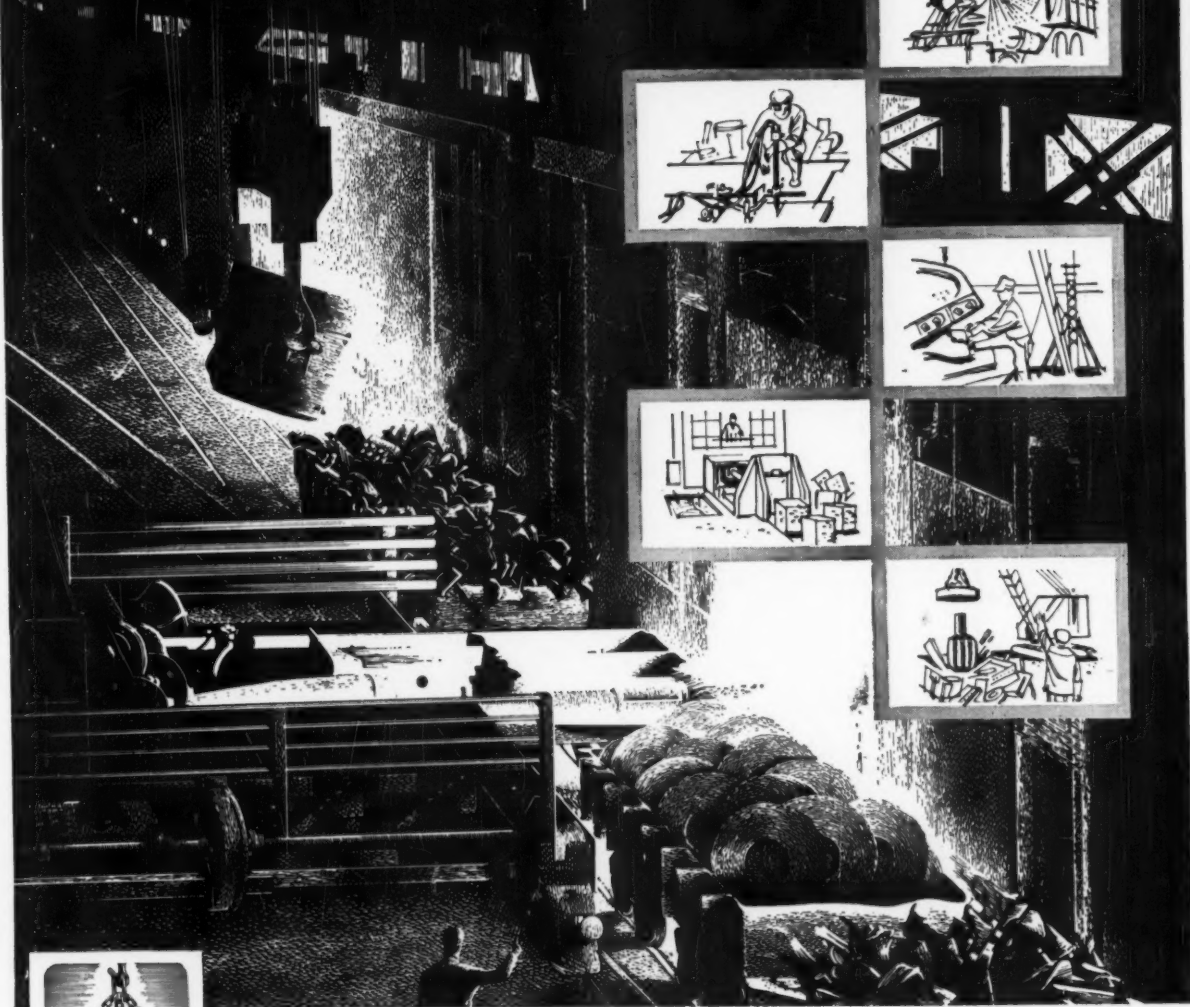
## Hamilton, Ont.

|  |                  |
|--|------------------|
| Brokers buying prices per gross ton on cars: |                  |
| No. 1 hvy. melting                           | \$32.25          |
| No. 2 hvy. melting                           | 28.25            |
| No. 1 dealer bundles                         | 32.25            |
| No. 2 bundles                                | 22.75            |
| Mixed steel scrap                            | 24.25            |
| Bush., new fact., prep'd                     | 32.25            |
| Bush., new fact., unprep'd                   | 26.25            |
| Machine shop turn.                           | 14.00            |
| Shortsteel turn.                             | 17.00            |
| Mixed bor. and turn.                         | 13.00            |
| Rails, rerolling                             | 37.00            |
| Cast scrap                                   | \$46.50 to 48.00 |

## Houston

|  |                  |
|--|------------------|
| Brokers buying prices per gross ton on cars: |                  |
| No. 1 hvy. melting                           | \$34.00          |
| No. 2 hvy. melting                           | 31.00            |
| No. 2 bundles                                | 22.00            |
| Machine shop turn.                           | 16.00            |
| Shoveling turnings                           | 20.00            |
| Cut structural plate 2 ft & under            | \$41.00 to 42.00 |
| Unstripped motor blocks                      | 37.00 to 38.00   |
| Cupola cast.                                 | 44.00 to 45.00   |
| Heavy breakable cast.                        | 27.00 to 28.00   |

for the purchase or sale of *scrap*



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# Metalmen in Cuba Have Problems

**Nationalization is hanging over nickel mines and plants owned by U. S., and U. S. concerns.**

**And now a House group says U. S. contract for cobalt hurts the domestic miners.**

■ Metalworking's problems in Cuba are becoming more complex, rather than easier.

Nationalization is still an oft-whispered word in official Cuban corridors. And more people are finding things they don't like about U. S. metalworking operations there.

## Here's the latest:

A House of Representatives Interior subcommittee is sharply critical of government purchases of foreign minerals. It says this has helped depress the domestic mining industry.

**Particularly singled out is cobalt from such "highly unstable market sources" as Cuba.**

Rep. Gracie Pfof (D., Ida.), says that because Cuba (and the Belgian Congo) got the lion's share of government contracts, an outfit in her home state, Calera Mining Co., has been forced into a depressed financial position.

**Call for Explanation**—The subcommittee has passed a resolution directing General Services Administration, the government buying agency, to explain its foreign purchase policies.

The only company with known cobalt holdings in Cuba is Freeport Nickel Co. Cobalt is a by-product

in mining nickel. However, Freeport says it is marginal. The company says it could not have obtained financing for the project without government contracts for both nickel and cobalt.

**Cobalt Contract**—The pacts call for the U. S. to pay the market price at the time the contracts were signed, March 1957, for up to 23,835,000 lb of cobalt, to June 30, 1965. The current price is about 25¢ per lb less than the government must pay.

It is unlikely anything will come of the subcommittee resolution. Freeport has been a target of a subcommittee on the price it charges the government smelter at Nicaro, Cuba, for ore. There has been much haranguing, but Freeport has not been moved.

A possibility: If public opinion built up, Freeport might have to agree to a modification of the contract to the current market price. But this is unlikely. Freeport will not be eager, nor will the steel and auto companies who backed the venture, based in great part on this government contract.

**Government Ownership** — Some observers say the longer the issue remains open the more likely Cuban industry is to be faced with Nationalization. However, it is beginning to look like Castro favors a sort of semi-government ownership of industry.

When asked recently whether he planned to nationalize the U. S. government-owned nickel plant at Nicaro, Cuba, Castro replied only that the plant should produce two

or three times as much as it does now to provide more jobs for Cubans. This has suggested to some observers that Cuba might be pondering the possibility of nationalizing only part of each company, taking only part of the profits, but with enough direct ownership to chart each company's course without resorting to general legislation or decree.

**Money Problems** — Where will Castro get the money? Some trade experts are convinced massive financial aid was one reason for Castro's recent visit to this country. They say he struck out.

Why? Observers say official but unspoken opinion in Washington is that Castro's current government is riddled with Soviet Communists.

## Copper

Rep. John J. Rhodes (R., Ariz.), says he has been assured "by reliable persons" that there is no move underway to sell OCDM copper.

Tin prices for the week: April 22—102.375; April 23—102.375; April 24 — 102.375; April 27 — 102.50; April 28—102.50.\*

\* Estimate.

## Primary Prices

| (cents per lb)  | current price | ask price | date of change |
|-----------------|---------------|-----------|----------------|
| Aluminum pig    | 24.70         | 24.80     | 8/1/58         |
| Aluminum ingot  | 26.80         | 26.10     | 8/1/58         |
| Copper (E)      | 31.50         | 30.00     | 3/8/59         |
| Copper (CS)     | 32.50         | 32.00     | 4/21/59        |
| Copper (L)      | 31.50         | 30.00     | 3/8/59         |
| Lead, St. L.    | 11.30         | 10.80     | 4/20/59        |
| Lead, N. Y.     | 11.50         | 11.80     | 4/20/59        |
| Magnesium ingot | 36.00         | 34.00     | 8/13/58        |
| Magnesium pig   | 35.25         | 33.75     | 8/13/58        |
| Nickel          | 74.00         | 64.50     | 12/6/58        |
| Titanium sponge | 162-182       | 185-205   | 11/3/58        |
| Zinc, E. St. L. | 11.00         | 11.50     | 2/25/59        |
| Zinc, N. Y.     | 11.50         | 12.00     | 2/25/59        |

**ALUMINUM:** 99% Ingot frt allwd. **COPPER:** (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. **LEAD:** common grade. **MAGNESIUM:** 99.8% pig Velasco, Tex. **NICKEL:** Port Colbourne, Canada. **ZINC:** prime western. Tin: See above; Other primary prices, pg. 156.

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# NONFERROUS PRICES

## MILL PRODUCTS

(Cents per lb unless otherwise noted)

### ALUMINUM

(Base 20,000 lb, f.o.b. ship pt., frt. allowed)

Flat Sheet (Mill Finish and Plate)  
("F" temper except 6061-0)

| Alloy      | .032 | .081 | .136 | .250 |
|------------|------|------|------|------|
| 1100, 3003 | 45.7 | 43.8 | 42.8 | 43.3 |
| 6052       | 53.1 | 48.4 | 46.9 | 46.0 |
| 6061-0     | 50.1 | 45.7 | 43.9 | 44.9 |

### Extruded Solid Shapes

| Factor | 6063 T-5  | 6062 T-6  |
|--------|-----------|-----------|
| 6-8    | 42.7-44.2 | 51.1-54.8 |
| 12-14  | 42.7-44.2 | 52.0-56.5 |
| 24-26  | 43.2-44.7 | 62.8-67.5 |
| 36-38  | 46.7-49.2 | 88.0-90.5 |

### Screw Machine Stock—2011-T-3

| Size" | 1/4  | 3/8  | 1/2  | 3/4  |
|-------|------|------|------|------|
| Price | 62.0 | 61.2 | 59.7 | 57.3 |

### Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

| Length"→  | 72      | 96      | 120     | 144     |
|-----------|---------|---------|---------|---------|
| .019 gage | \$1.411 | \$1.894 | \$2.353 | \$2.823 |
| .024 gage | 1.762   | 2.349   | 2.937   | 3.524   |

## MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed)

### Sheet and Plate

| Type→              | Gage→ | .250 | .250 | .188  | .081  | .032 |
|--------------------|-------|------|------|-------|-------|------|
| AZ31B Stand, Grade |       | 67.9 | 60.0 | 77.9  | 108.1 |      |
| AZ31B Spec.        |       | 93.3 | 95.7 | 108.7 | 171.3 |      |
| Tread Plate        |       | 70.6 | 71.7 |       |       |      |
| Tooling Plate      | 73.0  |      |      |       |       |      |

### Extruded Shapes

| Factor→                | 6-8  | 12-14 | 24-26 | 36-38 |
|------------------------|------|-------|-------|-------|
| Comm. Grade. (AZ31C)   | 69.6 | 70.7  | 75.6  | 89.2  |
| Spec. Grade... (AZ31B) | 84.6 | 85.7  | 90.6  | 104.2 |

### Alloy Ingot

AZ91B (Die Casting) 37.25 (delivered)  
AZ91A, AZ92A, AZ91C (Sand Casting) 40.75 (Velsco, Tex.)

## NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

"A" Nickel Monel

|               | Inconel |
|---------------|---------|
| Sheet, CR     | 126     |
| Strip, CR     | 124     |
| Rod, bar, HR  | 107     |
| Angles, HR    | 107     |
| Plates, HR    | 120     |
| Seamless tube | 157     |
| Shot, blocks  | 87      |

## COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

|               | Sheet | Wire  | Rod   | Tube  |
|---------------|-------|-------|-------|-------|
| Copper        | 55.63 | 52.86 | 55.83 |       |
| Brass, Yellow | 48.24 | 48.75 | 48.18 | 51.06 |
| Brass, Low    | 51.23 | 51.77 | 51.17 | 54.54 |
| Brass, R L    | 52.29 | 52.83 | 52.23 | 55.60 |
| Brass, Naval  | 52.80 | 52.83 | 52.23 | 55.21 |
| Muntz Metal   | 50.85 | 46.10 |       |       |
| Comm. Br.     | 53.90 | 54.44 | 53.84 | 56.96 |
| Mang. Br.     | 56.84 | 50.14 |       |       |
| Phos. Br. 5%  | 78.34 | 75.84 |       |       |

Free Casting Brass Rod 32.73

## TITANIUM

(Base prices, f.o.b. mill)

Sheet and strip, commercially pure, \$6.90-\$7.40; alloy, \$14.35. Plate, HR, commercially pure, \$5.00-\$5.75; alloy, \$7.75-\$8.50. Wire, rolled and/or drawn, commercially pure, \$5.50-\$6.00; alloy, \$8.00-\$9.50; Bar, HR or forged, commercially pure, \$4.25-\$4.65; alloy, \$4.25-\$7.15; billets, HR, commercially pure, \$3.55-\$4.10; alloy, \$3.55-\$5.75.

## PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex., 29.50  
Beryllium aluminum 5% Be, Dollar  
per lb contained Be \$74.75  
Beryllium copper, per lb contained Be \$43.00  
Beryllium 97% lump or beads,  
f.o.b. Cleveland, Reading \$71.50  
Bismuth, ton lots \$2.25  
Cadmium, del'd \$1.30  
Calcium, 99.9% small lots \$4.55  
Chromium, 99.8% metallic basis \$1.31  
Cobalt, 97-99% (per lb) \$1.75 to \$1.82  
Germanium, per gm, f.o.b. Miami,  
Okla., refined \$35.00 to \$42.00  
Gold, U. S. Treas., per troy oz. \$35.00  
Iridium, 99.9%, dollars per troy oz. \$2.25  
Iridium, dollars per troy oz. \$75 to \$85  
Lithium, 98% \$11.00 to \$14.00  
Magnesium, sticks, 100 to 500 lb \$59.00  
Mercury, dollars per 76-lb flask  
f.o.b. New York \$240 to \$245  
Nickel oxide sinter at Buffalo, N. Y.,  
or other U. S. points of entry,  
contained nickel 69.60  
Palladium, dollars per troy oz. \$18 to \$20  
Platinum, dollars per troy oz. \$77 to \$80  
Rhodium \$120.00 to \$125.00  
Silver ingots (¢ per troy oz.) \$1.375  
Thorium, per kg. \$43.00  
Vanadium \$3.45  
Zirconium sponge \$5.00

## REMELTED METALS

### Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot  
No. 115 30.25  
No. 120 29.00  
No. 123 28.00  
80-10-10 ingot  
No. 305 34.50  
No. 315 32.50  
88-10-2 ingot  
No. 210 43.50  
No. 215 39.25  
No. 245 35.00  
Yellow ingot  
No. 405 24.75  
Manganese bronze  
No. 421 27.75

### Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys  
0.30 copper max. 24.75-25.00  
0.60 copper max. 24.50-24.75  
Piston alloys (No. 122 type) 24.25-25.25  
No. 12 alum. (No. 2 grade) 21.50-22.00  
108 alloy 22.00-22.50  
195 alloy 25.00-26.00  
13 alloy (0.60 copper max.) 24.25-24.75  
AXS-679 (1 pct zinc) 21.75-22.25

(Effective April 23, 1959)

## Steel deoxidizing aluminum notch bar

granulated or shot

|                    |             |
|--------------------|-------------|
| Grade 1—95-97 1/2% | 22.50-23.50 |
| Grade 2—92-95%     | 21.25-22.25 |
| Grade 3—90-92%     | 20.25-21.25 |
| Grade 4—85-90%     | 17.50-18.50 |

## SCRAP METALS

### Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

|                       | Heavy  | Turnings |
|-----------------------|--------|----------|
| Copper                | 27 1/2 | 26 3/4   |
| Yellow brass          | 20 3/4 | 18 3/4   |
| Red brass             | 24 1/4 | 23 1/4   |
| Comm. bronze          | 25 1/4 | 24 3/4   |
| Mang. bronze          | 19 1/4 | 18 3/4   |
| Free cutting rod ends | 20 1/2 |          |

### Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

|                         |        |
|-------------------------|--------|
| No. 1 copper wire       | 27 1/2 |
| No. 2 copper wire       | 26     |
| Light copper            | 24     |
| *Refinery brass         | 25 3/4 |
| Copper bearing material | 24 3/4 |
| *Dry copper content     |        |

### Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

|                          |        |
|--------------------------|--------|
| No. 1 copper wire        | 27 1/2 |
| No. 2 copper wire        | 26     |
| Light copper             | 24     |
| No. 1 composition        | 21 1/2 |
| No. 1 comp. turnings     | 21     |
| Hvy. yellow brass solids | 15 3/4 |
| Brass pipe               | 16 1/2 |
| Radiators                | 17     |

### Aluminum

|                     |         |
|---------------------|---------|
| Mixed old cast      | 12 — 13 |
| Mixed new clips     | 15 — 16 |
| Mixed turnings, dry | 13 — 14 |

### Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

### Copper and Brass

|                            |                 |
|----------------------------|-----------------|
| No. 1 copper wire          | 24 1/4 — 24 3/4 |
| No. 2 copper wire          | 22 1/4 — 22 3/4 |
| Light copper               | 20 1/4 — 20 3/4 |
| Auto radiators (unsweated) | 14 1/4 — 15     |
| No. 1 composition          | 19 — 19 1/2     |
| No. 1 composition turnings | 17 1/2 — 18     |
| Cocks and faucets          | 15 — 15 1/2     |
| Clean heavy yellow brass   | 13 1/2 — 13 3/4 |
| Brass pipe                 | 15 — 15 1/2     |
| New soft brass clippings   | 15 1/4 — 16 1/4 |
| No. 1 brass rod turnings   | 13 — 13 1/2     |

### Aluminum

|                              |             |
|------------------------------|-------------|
| Alum. pistons and struts     | 6 — 6 1/2   |
| Aluminum crankcase           | 9 1/2 — 10  |
| 1100 (28) aluminum clippings | 13 — 13 1/2 |
| Old sheet and utensils       | 9 1/2 — 10  |
| Borings and turnings         | 6 — 6 3/4   |
| Industrial castings          | 9 1/2 — 10  |
| 2020 (24S) clippings         | 11 — 11 1/2 |

### Zinc

|                    |               |
|--------------------|---------------|
| New zinc clippings | 4 3/4 — 5 1/4 |
| Old zinc           | 3 1/4 — 3 3/4 |
| Zinc routings      | 2 — 2 1/4     |
| Old die cast scrap | 1 1/2 — 2     |

### Nickel and Monel

|                                |       |
|--------------------------------|-------|
| Pure nickel clippings          | 52-54 |
| Clean nickel turnings          | 37-40 |
| Nickel anodes                  | 52-54 |
| Nickel rod ends                | 52-54 |
| New Monel clippings            | 30-32 |
| Clean Monel turnings           | 30-32 |
| Old sheet Monel                | 26-28 |
| Nickel Silver clippings, mixed | 18    |
| Nickel silver turnings, mixed  | 15    |

### Lead

|                      |               |
|----------------------|---------------|
| Soft scrap lead      | 7 — 7 1/4     |
| Battery plates (dry) | 2 — 2 1/4     |
| Batteries, acid free | 1 1/2 — 2 1/4 |

### Miscellaneous

|                         |                 |
|-------------------------|-----------------|
| Block tin               | 77 — 78         |
| No. 1 pewter            | 59 — 60         |
| Auto babbitt            | 40 — 41         |
| Mixer common babbitt    | 9 1/2 — 10      |
| Solder joints           | 13 1/4 — 13 3/4 |
| Siphon tops             | 42              |
| Small foundry type      | 9 1/2 — 10      |
| Monotype                | 9 1/2 — 10      |
| Lino. and stereotype    | 8 1/2 — 9       |
| Electrotype             | 5 1/4 — 5 3/4   |
| Hand picked type shells | 5 1/4 — 5 3/4   |
| Lino. and stereo. dross | 2 1/4 — 2 3/4   |
| Electro dross           | 2 1/4 — 2 3/4   |



## IRON AGE

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

STEEL  
PRICES

|             | BILLETS, BLOOMS,<br>SLABS                                     |                              |                        | PIL-<br>ING                 | SHAPES<br>STRUCTURALS |                         |                           | STRIP          |                     |                              |                              |                         |                                   |
|-------------|---|------------------------------|------------------------|-----------------------------|-----------------------|-------------------------|---------------------------|----------------|---------------------|------------------------------|------------------------------|-------------------------|-----------------------------------|
|             | Carbon<br>Re-rolling<br>Net Ton                               | Carbon<br>Forging<br>Net Ton | Alloy<br>Net Ton       |                             | Carbon                | Hi Str.<br>Low<br>Alloy | Carbon<br>Wide-<br>Flange | Hot-<br>rolled | Cold-<br>rolled     | Hi Str.<br>H.R. Low<br>Alloy | Hi Str.<br>C.R. Low<br>Alloy | Alloy<br>Hot-<br>rolled | Alloy<br>Cold-<br>rolled          |
| EAST        | Bethlehem, Pa.  |                              | \$119.00 B3            |                             | 5.55 B3               | 8.10 B3                 | 5.55 B5                   |                |                     |                              |                              |                         |                                   |
|             | Buffalo, N. Y.  | \$80.00 R3,<br>B3            | \$99.50 R3,<br>B3      | \$119.00 R3,<br>B3          | 6.50 B3               | 5.55 B3                 | 8.10 B3                   | 5.55 B3        | 5.10 B3,<br>R3      | 7.425 S10,<br>R7             | 7.575 B3                     |                         |                                   |
|             | Phila., Pa.   |                              |                        |                             |                       |                         |                           |                | 7.875 P15           |                              |                              |                         |                                   |
|             | Harrison, N. J.   |                              |                        |                             |                       |                         |                           |                |                     |                              |                              |                         | 15.55 C11                         |
|             | Conschocken, Pa.  |                              | \$104.50 A2            | \$126.00 A2                 |                       |                         |                           | 5.15 A2        |                     | 7.575 A2                     |                              |                         |                                   |
|             | New Bedford, Mass.  |                              |                        |                             |                       |                         |                           |                | 7.875 R6            |                              |                              |                         |                                   |
|             | Johnstown, Pa.  | \$80.00 B3                   | \$99.50 B3             | \$119.00 B3                 |                       | 5.55 B3                 | 8.10 B3                   |                |                     |                              |                              |                         |                                   |
|             | Boston, Mass.   |                              |                        |                             |                       |                         |                           |                | 7.975 T8            |                              |                              |                         |                                   |
|             | New Haven, Conn.  |                              |                        |                             |                       |                         |                           |                | 7.875 D1            |                              |                              |                         |                                   |
|             | Baltimore, Md.  |                              |                        |                             |                       |                         |                           |                | 7.425 T8            |                              |                              |                         | 15.90 T8                          |
|             | Phoenixville, Pa.   |                              |                        |                             | 5.55 P2               |                         | 5.55 P2                   |                |                     |                              |                              |                         |                                   |
|             | Sparrows Pt., Md.   |                              |                        |                             |                       |                         |                           | 5.10 B3        |                     | 7.575 B3                     |                              |                         |                                   |
|             | New Britain,<br>Bridgeport,<br>Wallingford, Conn.             |                              |                        | \$119.00 N8                 |                       |                         |                           |                | 7.875 W1, S7        |                              |                              |                         |                                   |
|             | Pawtucket, R. I.<br>Worcester, Mass.                          |                              |                        |                             |                       |                         |                           |                | 7.975 N7,<br>A5     |                              |                              |                         | 15.90 N7<br>15.70 T8              |
| MIDDLE WEST | Alton, Ill.   |                              |                        |                             |                       |                         |                           | 5.30 L1        |                     |                              |                              |                         |                                   |
|             | Ashland, Ky.  |                              |                        |                             |                       |                         |                           | 5.10 A7        |                     | 7.575 A7                     |                              |                         |                                   |
|             | Canton-Massillon,<br>Dover, Ohio                              |                              | \$102.00 R3            | \$119.00 R3,<br>\$114.00 T3 |                       |                         |                           |                | 7.425 G4            |                              | 10.80 G4                     |                         |                                   |
|             | Chicago, Franklin Park,<br>Evanston, Ill.                     | \$80.00 U1,<br>R3            | \$99.50 U1,<br>R3, W8  | \$119.00 U1,<br>R3, W8      | 6.50 U1               | 5.50 U1,<br>W8, P13     | 8.05 U1,<br>Y1, W8        | 5.50 U1        | 5.10 W8,<br>N4, A1  | 7.525 A1, T8,<br>M8          | 7.575 W8                     | 8.40 W8,<br>S9, I3      | 15.55 A1,<br>S9, G4, T8           |
|             | Cleveland, Ohio   |                              |                        |                             |                       |                         |                           |                |                     | 7.425 A5, J3                 |                              | 10.75 A5                | 8.40 J3                           |
|             | Detroit, Mich.  |                              |                        | \$119.00 R5                 |                       |                         |                           |                | 5.10 G3,<br>M2      | 7.425 M2, S1,<br>D1, P11     | 7.575 G3                     | 10.80 S1                |                                   |
|             | Anderson, Ind.  |                              |                        |                             |                       |                         |                           |                |                     | 7.425 G4                     |                              |                         |                                   |
|             | Gary, Ind. Harbor,<br>Indiana                                 | \$80.00 U1                   | \$99.50 U1             | \$119.00 U1,<br>Y1          |                       | 5.50 U1,<br>I3          | 8.05 U1,<br>J3            | 5.50 I3        | 5.10 U1,<br>I3, Y1  | 7.425 Y1                     | 7.575 U1,<br>I3, Y1          | 10.90 Y1                | 8.40 U1,<br>Y1                    |
|             | Sterling, Ill.  | \$80.00 N4                   |                        |                             |                       | 5.50 N4                 | 7.75 N4                   | 5.50 N4        | 5.20 N4             |                              |                              |                         |                                   |
|             | Indianapolis, Ind.  |                              |                        |                             |                       |                         |                           |                |                     | 7.575 R5                     |                              |                         | 15.70 R5                          |
|             | Newport, Ky.  |                              |                        |                             |                       |                         |                           | 5.10 A9        |                     |                              |                              | 8.40 A9                 |                                   |
|             | Niles, Warren, Ohio<br>Sharon, Pa.                            |                              | \$99.50 S1,<br>C10     | \$119.00 C10, S1            |                       |                         |                           |                | 5.10 R3,<br>S1      | 7.425 R3,<br>T4, S1          | 7.575 R3,<br>S1              | 10.80 R3,<br>S1         | 8.40 S1<br>15.55 S1               |
|             | Owensboro, Ky.  | \$80.00 G5                   | \$99.50 G5             | \$119.00 G5                 |                       |                         |                           |                |                     |                              |                              |                         |                                   |
|             | Pittsburgh, Midland, Butler,<br>Aliquippa,<br>McKeesport, Pa. | \$80.00 U1,<br>P6            | \$99.50 U1,<br>C11, P6 | \$119.00 U1,<br>C11, B7     | 6.50 U1               | 5.50 U1,<br>J3          | 8.05 U1,<br>J3            | 5.50 U1        | 5.10 P6             | 7.425 J3, B4<br>7.525 E3     |                              | 8.40 S9                 | 15.55 S9                          |
| WEST        | Weirton, Wheeling,<br>Follansbee, W. Va.                      |                              |                        |                             | 6.50 U1,<br>W3        | 5.50 W3                 |                           | 5.50 W3        | 5.10 W3             | 7.425 F3                     | 7.575 W3                     | 10.80 W3                |                                   |
|             | Youngstown, Ohio  | \$80.00 R3                   | \$99.50 Y1,<br>C10     | \$119.00 Y1                 |                       |                         | 8.05 Y1                   |                | 5.10 U1             | 7.425 Y1, R5<br>Y1           | 7.575 U1,<br>Y1              | 10.95 Y1                | 8.40 U1,<br>Y1<br>15.55 R5,<br>Y1 |
|             | Fontana, Cal.   | \$90.50 K1                   | \$109.00 K1            | \$140.00 K1                 |                       | 6.30 K1                 | 8.85 K1                   | 6.45 K1        | 5.825 K1            | 9.20 K1                      |                              |                         |                                   |
|             | Geneva, Utah  |                              | \$99.50 C7             |                             |                       | 5.50 C7                 | 8.05 C7                   |                |                     |                              |                              |                         |                                   |
|             | Kansas City, Mo.  |                              |                        |                             |                       | 5.60 S2                 | 8.15 S2                   |                |                     |                              |                              | 8.65 S2                 |                                   |
|             | Los Angeles, Torrance, Cal.                                   |                              | \$109.00 B2            | \$139.00 B2                 |                       | 6.20 C7,<br>B2          | 8.75 B2                   |                | 5.85 C7,<br>B2      | 9.30 C1, R5                  |                              | 9.60 B2                 | 17.75 J3                          |
|             | Minnequa, Colo.   |                              |                        |                             |                       | 5.80 C6                 |                           |                | 6.20 C6             | 9.375 C6                     |                              |                         |                                   |
|             | Portland, Ore.  |                              |                        |                             |                       | 6.75 O2                 |                           |                |                     |                              |                              |                         |                                   |
|             | San Francisco, Niles,<br>Pittsburg, Cal.                      |                              | \$109.00 B2            |                             |                       | 6.15 B2                 | 8.70 B2                   |                | 5.85 C7,<br>B2      |                              |                              |                         |                                   |
|             | Seattle, Wash.  |                              | \$109.00 B2            |                             |                       | 6.25 B2                 | 8.80 B2                   |                | 6.10 B2             |                              |                              |                         |                                   |
|             | Atlanta, Ga.  |                              |                        |                             |                       | 5.70 A8                 |                           |                | 5.10 A8             |                              |                              |                         |                                   |
|             | Fairfield, Ala. City,<br>Birmingham, Ala.                     | \$80.00 T2                   | \$99.50 T2             |                             |                       | 5.50 T2<br>R3, C16      | 8.05 T2                   |                | 5.10 T2,<br>R3, C16 |                              | 7.575 T2                     |                         |                                   |
|             | Houston, Lone Star,<br>Texas                                  |                              | \$104.50 S2            | \$124.00 S2                 |                       | 5.60 S2                 | 8.15 S2                   |                |                     |                              |                              | 8.65 S2                 |                                   |

(Effective April 27, 1959)

## IRON AGE

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

STEEL  
PRICES

| STEEL PRICES |   | SHEETS                    |                  |                         |                  |               |                        |                        | WIRE ROD      | TINPLATE†               |   | Holloware Enameling 29 ga. |                             |
|--------------|---|---------------------------|------------------|-------------------------|------------------|---------------|------------------------|------------------------|---------------|-------------------------|---|----------------------------|-----------------------------|
|              |   | Hot-rolled 18 ga. & hvyr. | Cold-rolled      | Galvanized (Hot-dipped) | Enamel-ing       | Long Terns    | Hi Str. Low Alloy H.R. | Hi Str. Low Alloy C.R. |               | Hi Str. Low Alloy Galv. | Cokes* 1.25-lb. base box  |                            | Electro** 0.25-lb. base box |
| EAST         | Buffalo, N. Y.  | 5.10 B3                   | 6.275 B3         |                         |                  |               | 7.525 B3               | 9.275 B3               |               | 6.40 W6                 | † Special coated mfg. turns deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢.<br>Can-making quality BLACKPLATE 55 to 128 lb. deduct \$2.20 from 1.25 lb. coke base box.<br>* COKES: 1.50-lb. add 25¢.<br>**ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add \$1.00. Differential 1.00 lb./0.25 lb. add 65¢. |                            |                             |
|              | Claymont, Del.  |                           |                  |                         |                  |               |                        |                        |               |                         |   |                            |                             |
|              | Coatesville, Pa.  |                           |                  |                         |                  |               |                        |                        |               |                         |   |                            |                             |
|              | Conschocken, Pa.  | 5.15 A2                   | 6.325 A2         |                         |                  |               | 7.575 A2               |                        |               |                         |   |                            |                             |
|              | Harrisburg, Pa.   |                           |                  |                         |                  |               |                        |                        |               |                         |   |                            |                             |
|              | Hartford, Conn.   |                           |                  |                         |                  |               |                        |                        |               |                         |   |                            |                             |
|              | Johnstown, Pa.  |                           |                  |                         |                  |               |                        |                        | 6.40 B3       |                         |   |                            |                             |
|              | Fairless, Pa.   | 5.15 U1                   | 6.325 U1         |                         |                  |               | 7.575 U1               | 9.325 U1               |               | \$10.50 U1              | \$9.20 U1   |                            |                             |
|              | New Haven, Conn.  |                           |                  |                         |                  |               |                        |                        |               |                         |   |                            |                             |
|              | Phoenixville, Pa.   |                           |                  |                         |                  |               |                        |                        |               |                         |   |                            |                             |
|              | Sparrows Pt., Md.   | 5.10 B3                   | 6.275 B3         | 6.875 B3                |                  |               | 7.525 B3               | 9.275 B3               | 10.025 B3     | 6.50 B3                 | \$10.40 B3  | \$9.10 B3                  |                             |
|              | Worcester, Mass.  |                           |                  |                         |                  |               |                        |                        |               | 6.70 A5                 |   |                            |                             |
| MIDDLE WEST  | Trenton, N. J.  |                           |                  |                         |                  |               |                        |                        |               |                         |   |                            |                             |
|              | Alton, Ill.   |                           |                  |                         |                  |               |                        |                        |               | 6.60 L1                 |   |                            |                             |
|              | Ashland, Ky.  | 5.10 A7                   |                  | 6.875 A7                | 6.775 A7         |               | 7.525 A7               |                        |               |                         |   |                            |                             |
|              | Canton-Massillon, Dover, Ohio                                   |                           |                  | 6.875 R1, R3            |                  |               |                        |                        |               |                         |   |                            |                             |
|              | Chicago, Joliet, Ill.   | 5.10 W8, A1               |                  |                         |                  |               | 7.525 U1, W8           |                        |               | 6.40 A5, R3, W8         |   |                            |                             |
|              | Sterling, Ill.  |                           |                  |                         |                  |               |                        |                        |               | 6.50 N4, K2             |   |                            |                             |
|              | Cleveland, Ohio   | 5.10 R3, J3               | 6.275 R3, J3     | 7.65 R3*                | 6.775 R3         |               | 7.525 R3, J3           | 9.275 R3, J3           |               | 6.40 A5                 |   |                            |                             |
|              | Detroit, Mich.  | 5.10 G3, M2               | 6.275 G3, M2     |                         |                  |               | 7.525 G3               | 9.275 G3               |               |                         |   |                            |                             |
|              | Newport, Ky.  | 5.10 A1                   | 6.275 A1         |                         |                  |               |                        |                        |               |                         |   |                            |                             |
|              | Gary, Ind. Harbor, Indiana                                      | 5.10 U1, I3, Y1           | 6.275 U1, I3, Y1 | 6.875 U1, I3            | 6.775 U1, I3, Y1 | 7.225 U1      | 7.525 U1, Y1, I3       | 9.275 U1, Y1           |               | 6.40 Y1                 | \$10.40 U1, Y1  | \$9.10 I3, U1, Y1          | 7.85 U1, Y1                 |
|              | Granite City, Ill.  | 5.20 G2                   | 6.375 G2         | 6.975 G2                | 6.875 G2         |               |                        |                        |               |                         | \$9.20 G2   | 7.95 G2                    |                             |
|              | Kokomo, Ind.  |                           |                  | 6.975 C9                |                  |               |                        |                        |               | 6.50 C9                 |   |                            |                             |
|              | Mansfield, Ohio   | 5.10 E2                   | 6.275 E2         |                         |                  | 7.225 E2      |                        |                        |               |                         |   |                            |                             |
|              | Middletown, Ohio  |                           | 6.275 A7         | 6.875 A7                | 6.775 A7         | 7.225 A7      |                        |                        |               |                         |   |                            |                             |
|              | Niles, Warren, Ohio Sharon, Pa.                                 | 5.10 R3, S1               | 6.275 R3         | 6.875 R3 7.65 R3*       | 6.775 S1         | 7.225 S1*, R3 | 7.525 R3, S1           | 9.275 R3,              |               |                         | \$9.10 R3   |                            |                             |
|              | Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa. | 5.10 U1, J3, P6           | 6.275 U1, J3, P6 | 6.875 U1, J3 7.50 E3*   | 6.775 U1         |               | 7.525 U1, J3           | 9.275 U1, J3           | 10.025 U1, J3 | 6.40 A5, J3, P6         | \$10.40 W5, J3  | \$9.10 U1, J3              | 7.85 U1, J3                 |
|              | Portsmouth, Ohio  | 5.10 P7                   | 6.275 P7         |                         |                  |               |                        |                        |               | 6.40 P7                 |   |                            |                             |
|              | Weirton, Wheeling, Follansbee, W. Va.                           | 5.10 W3, W5               | 6.275 W3, F3, W5 | 6.875 W3, W5 7.50 W3*   |                  | 7.225 W3, W5  | 7.525 W3               | 9.275 W3               |               |                         | \$10.40 W5, W3  | \$9.10 W5, W3              | 7.85 W5                     |
|              | Youngstown, Ohio  | 5.10 U1, Y1               | 6.275 Y1         | 7.50 J3*                | 6.775 Y1         |               | 7.525 Y1               | 9.275 Y1               |               | 6.40 Y1                 |   |                            |                             |
| WEST         | Fontana, Cal.   | 5.825 K1                  | 7.40 K1          |                         |                  |               | 8.25 K1                | 10.40 K1               |               |                         | \$11.05 K1  | \$9.75 K1                  |                             |
|              | Geneva, Utah  | 5.20 C7                   |                  |                         |                  |               |                        |                        |               |                         |   |                            |                             |
|              | Kansas City, Mo.  |                           |                  |                         |                  |               |                        |                        |               | 6.65 S2                 |   |                            |                             |
|              | Los Angeles, Torrance, Cal.                                     |                           |                  |                         |                  |               |                        |                        |               | 7.20 B2                 |   |                            |                             |
|              | Minnequa, Colo.   |                           |                  |                         |                  |               |                        |                        |               | 6.65 C6                 |   |                            |                             |
|              | San Francisco, Niles, Pittsburg, Cal.                           | 5.80 C7                   | 7.225 C7         | 7.625 C7                |                  |               |                        |                        |               | 7.20 C7                 | \$11.05 C7  | \$9.75 C7                  |                             |
| SOUTH        | Atlanta, Ga.  |                           |                  |                         |                  |               |                        |                        |               |                         |   |                            |                             |
|              | Fairfield, Ala. Alabama City, Ala.                              | 5.10 T2, R3               | 6.275 T2, R3     | 6.875 T2, R3            | 6.775 T2         |               |                        |                        |               | 6.40 T2, R3             | \$10.50 T2  | \$9.20 T2                  |                             |
|              | Houston, Texas  |                           |                  |                         |                  |               |                        |                        |               | 6.65 S2                 |   |                            |                             |

\* Electrogalvanized sheets.

(Effective April 27, 1959)

\*7.425 at Sharon-Niles in 7.225

STEEL  
PRICES

| STEEL<br>PRICES |  | BARS                   |                                |                                      |                     |                                | PLATES                 |                   |              |                | WIRE              |                          |
|-----------------|--|------------------------|--------------------------------|--------------------------------------|---------------------|--------------------------------|------------------------|-------------------|--------------|----------------|-------------------|--------------------------|
|                 |  | Carbon Steel           | Reinforcing                    | Cold Finished                        | Alloy Hot-rolled    | Alloy Cold Drawn               | Hi Str. H.R. Low Alloy | Carbon Steel      | Floor Plate  | Alloy          | Hi Str. Low Alloy | Mfr's. Bright            |
| EAST            | Bethlehem, Pa.                                   |                        |                                |                                      | 6.725 B3            | 9.025 B3                       | 8.30 B3                |                   |              |                |                   |                          |
|                 | Buffalo, N. Y.                                   | 5.675 R3,B3            | 5.675 R3,B3                    | 7.70 B5                              | 6.725 B3,R3         | 9.025 B3,B5                    | 8.30 B3                | 5.30 B3           |              |                |                   | 8.00 W6                  |
|                 | Claymont, Del.                                   |                        |                                |                                      |                     |                                |                        | 5.30 C4           |              | 7.50 C4        | 7.95 C4           |                          |
|                 | Coatesville, Pa.                                 |                        |                                |                                      |                     |                                |                        | 5.30 L4           |              | 7.50 L4        | 7.95 L4           |                          |
|                 | Conshohocken, Pa.                                |                        |                                |                                      |                     |                                |                        | 5.30 A2           | 6.375 A2     | 7.50 A2        | 7.95 A2           |                          |
|                 | Harrisburg, Pa.                                  |                        |                                |                                      |                     |                                |                        | 5.30 P2           | 6.375 P2     |                |                   |                          |
|                 | Milton, Pa.                                      | 5.825 M7               | 5.825 M7                       |                                      |                     |                                |                        |                   |              |                |                   |                          |
|                 | Hartford, Conn.                                  |                        |                                | 8.15 R3                              |                     | 9.325 R3                       |                        |                   |              |                |                   |                          |
|                 | Johnstown, Pa.                                   | 5.675 B3               | 5.675 B3                       |                                      | 6.725 B3            |                                | 8.30 B3                | 5.30 B3           |              | 7.50 B3        | 7.95 B3           | 8.00 B3                  |
|                 | Fairless, Pa.                                    | 5.825 U1               | 5.825 U1                       |                                      | 6.875 U1            |                                |                        |                   |              |                |                   |                          |
|                 | Newark, Camden, N. J.                            |                        |                                | 8.10 W10, P10                        |                     | 9.20 W10, P10                  |                        |                   |              |                |                   |                          |
|                 | Bridgeport, Putnam, Willimantic, Conn.           |                        |                                | 8.20 W10 8.15 J3                     | 6.80 N8             | 9.175 N8                       |                        |                   |              |                |                   |                          |
|                 | Sparrows Pt., Md.                                |                        | 5.675 B3                       |                                      |                     |                                |                        | 5.30 B3           |              | 7.50 B3        | 7.95 B3           | 8.10 B3                  |
|                 | Palmer, Worcester, Readville, Mansfield, Mass.   |                        |                                | 8.20 B5, C14                         |                     | 9.325 A5,B5                    |                        |                   |              |                |                   | 8.30 A5, W6              |
|                 | Spring City, Pa.                                 |                        |                                | 8.10 K4                              |                     | 9.20 K4                        |                        |                   |              |                |                   |                          |
| MIDDLE WEST     | Alton, Ill.                                      | 5.875 L1               |                                |                                      |                     |                                |                        |                   |              |                |                   | 8.20 L1                  |
|                 | Ashland,Newport,Ky.                              |                        |                                |                                      |                     |                                |                        | 5.30 A7, A9       |              | 7.50 A9        | 7.95 A7           |                          |
|                 | Canton, Massillon, Mansfield, Ohio               | 6.15* R3               |                                | 7.65 R3,R2                           | 6.725 R3 6.475 T5   | 9.025 R3,R2 8.775 T5           |                        | 5.30 E2           |              |                |                   |                          |
|                 | Chicago, Joliet, Waukegan, Madison, Harvey, Ill. | 5.675 U1,R3, W8,N4,P13 | 5.675 U1,R3, N4,P13,W8 5.875L1 | 7.65 A5, W10,W8, B5,L2,N9            | 6.725 U1,R3, W8     | 9.025 A5, W10,W8, L2,N8,B5     | 8.30 U1,W8, R3         | 5.30 U1,A1, W8,I3 | 6.375 U1     | 7.50 U1, W8    | 7.95 U1, W8       | 8.00 A5,R3, W8,N4, K2,W7 |
|                 | Cleveland, Elyria, Ohio                          | 5.675 R3               | 5.675 R3                       | 7.65 A5,C13, C18                     |                     | 9.025 A5, C13,C18              | 8.30 R3                | 5.30 R3,J3        | 6.375 J3     |                | 7.95 R3,J3        | 8.00 A5, C13,C18         |
|                 | Detroit, Mich.                                   | 5.675 G3               | 5.675 G3                       | 7.90 P3 7.85 P8,B5 7.65 R5           | 6.725 R5,G3         | 9.025 R5 9.225 B5,P3, P8       | 8.30 G3                | 5.30 G3           |              | 7.50 G3        | 7.95 G3           |                          |
|                 | Duluth, Minn.                                    |                        |                                |                                      |                     |                                |                        |                   |              |                |                   | 8.00 A5                  |
|                 | Gary, Ind. Harbor, Crawfordville, Hammond, Ind.  | 5.675 U1,I3, Y1        | 5.675 U1,I3, Y1                | 7.65 R3,J3                           | 6.725 U1,I3, Y1     | 9.025 R3,M4                    | 8.30 U1,Y1             | 5.30 U1,I3, Y1    | 6.375 J3, I1 | 7.50 U1, Y1    | 7.95 U1, Y1,I3    | 8.10 M4                  |
|                 | Granite City, Ill.                               |                        |                                |                                      |                     |                                |                        | 5.40 G2           |              |                |                   |                          |
|                 | Kokomo, Ind.                                     |                        | 5.775 C9                       |                                      |                     |                                |                        |                   |              |                |                   | 8.10 C9                  |
|                 | Sterling, Ill.                                   | 5.775 N4               | 5.775 N4                       |                                      |                     |                                |                        | 5.30 N4           |              |                |                   | 8.10 K2                  |
|                 | Niles, Warren, Ohio Sharon, Pa.                  |                        |                                | 7.65 C10                             | 6.725 C10           | 9.025 C10                      |                        | 5.30 R3,S1        |              | 7.50 S1        | 7.95 R3, S1       |                          |
|                 | Owensboro, Ky.                                   | 5.675 G5               |                                |                                      | 6.725 G5            |                                |                        |                   |              |                |                   |                          |
|                 | Pittsburgh, Midland, Donora, Aliquippa, Pa.      | 5.675 U1,J3            | 5.675 U1,J3                    | 7.65 A5,B4, R3,J3,C11, W10,S9,C8, M9 | 6.725 U1,J3, C11,B7 | 9.025 A5, W10,R3,S9, C11,C8,M9 | 8.30 U1,J3             | 5.30 U1,J3        | 6.375 U1,J3  | 7.50 U1, J3,B7 | 7.95 U1, J3,B7    | 8.00 A5, J3,P6           |
|                 | Portsmouth, Ohio                                 |                        |                                |                                      |                     |                                |                        |                   |              |                |                   | 8.00 P7                  |
| WEST            | Weirton, Wheeling, Follansbee, W. Va.            |                        |                                |                                      |                     |                                |                        | 5.30 W5           |              |                |                   |                          |
|                 | Youngstown, Ohio                                 | 5.675 U1,R3, Y1        | 5.675 U1,R3, Y1                | 7.65 A1,Y1, F2                       | 6.725 U1,Y1         | 9.025 Y1,F2                    | 8.30 U1,Y1             | 5.30 U1, R3,Y1    |              | 7.50 Y1        | 7.95 U1,Y1        | 8.00 Y1                  |
|                 | Emeryville, Fontana, Cal.                        | 6.425 J5 6.375 K1      | 6.425 J5 6.375 K1              |                                      | 7.775 K1            |                                | 9.00 K1                | 6.10 K1           |              | 8.30 K1        | 8.75 K1           |                          |
|                 | Geneva, Utah                                     |                        |                                |                                      |                     |                                |                        | 5.30 C7           |              |                | 7.95 C7           |                          |
|                 | Kansas City, Mo.                                 | 5.925 S2               | 5.925 S2                       |                                      | 6.975 S2            |                                | 8.55 S2                |                   |              |                |                   | 8.25 S2                  |
|                 | Los Angeles, Torrance, Cal.                      | 6.375 C7,B2            | 6.375 C7,B2                    | 9.10 R3,P14, S12                     | 7.775 B2            | 11.00 P14, S12                 | 8.625 B2               |                   |              |                |                   | 8.95 B2                  |
|                 | Minnequa, Colo.                                  | 6.125 C6               | 6.125 C6                       |                                      |                     |                                |                        | 6.15 C6           |              |                |                   | 8.25 C6                  |
|                 | Portland, Ore.                                   | 6.425 O2               | 6.425 O2                       |                                      |                     |                                |                        |                   |              |                |                   |                          |
|                 | San Francisco, Niles, Pittsburg, Cal.            | 6.375 C7 6.425 B2      | 6.375 C7 6.425 B2              |                                      |                     |                                | 8.675 B2               |                   |              |                |                   | 8.95 C7,C6               |
|                 | Seattle, Wash.                                   | 6.425 B2,N6            | 6.425 B2                       |                                      |                     |                                | 8.675 B2               | 6.20 B2           |              | 8.40 B2        | 8.85 B2           |                          |
|                 | Atlanta, Ga.                                     | 5.875 A8               | 5.675 A8                       |                                      |                     |                                |                        |                   |              |                |                   | 8.00 A8                  |
|                 | Fairfield City, Ala. Birmingham, Ala.            | 5.675 T2,R3, C16       | 5.675 T2,R3, C16               | 8.25 C16                             |                     |                                | 8.30 T2                | 5.30 T2,R3        |              |                | 7.95 T2           | 8.00 T2,R3               |
|                 | Houston, Ft. Worth, Lone Star, Texas             | 5.925 S2               | 5.925 S2                       |                                      | 6.975 S2            |                                | 8.55 S2                | 5.40 S2           |              | 7.60 S2        | 8.05 S2           | 8.25 S2                  |

† Merchant Quality—Special Quality 35¢ higher.

(Effective April 27, 1959)

\* Special Quality.



# STEEL PRICES

## Key to Steel Producers

### With Principal Offices

- A1 Acme Steel Co., Chicago
- A2 Alan Wood Steel Co., Conshohocken, Pa.
- A3 Allegheny Ludlum Steel Corp., Pittsburgh
- A4 American Cladmetals Co., Carnegie, Pa.
- A5 American Steel & Wire Div., Cleveland
- A6 Angel Nail & Chaplet Co., Cleveland
- A7 Armco Steel Corp., Middletown, Ohio
- A8 Atlantic Steel Co., Atlanta, Ga.
- A9 Acme-Newport Steel Co., Newport, Ky.
- B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
- B2 Bethlehem Pacific Coast Steel Corp., San Francisco
- B3 Bethlehem Steel Co., Bethlehem, Pa.
- B4 Blair Strip Steel Co., New Castle, Pa.
- B5 Bliss & Laughlin, Inc., Harvey, Ill.
- B6 Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
- B7 A. M. Byers, Pittsburgh
- B8 Braeburn Alloy Steel Corp., Braeburn, Pa.
- C1 Calstrip Steel Corp., Los Angeles
- C2 Carpenter Steel Co., Reading, Pa.
- C4 Claymont Products Dept., Claymont, Del.
- C6 Colorado Fuel & Iron Corp., Denver
- C7 Columbia Geneva Steel Div., San Francisco
- C8 Columbia Steel & Shifting Co., Pittsburgh
- C9 Continental Steel Corp., Kokomo, Ind.
- C10 Copperweld Steel Co., Pittsburgh, Pa.
- C11 Crucible Steel Co. of America, Pittsburgh
- C13 Cuyahoga Steel & Wire Co., Cleveland
- C14 Compressed Steel Shifting Co., Readville, Mass.
- C15 G. O. Carlson, Inc., Thorndale, Pa.
- C16 Connors Steel Div., Birmingham
- C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.
- D1 Detroit Steel Corp., Detroit
- D2 Driver, Wilbur B. Co., Newark, N. J.
- D3 Driver Harris Co., Harrison, N. J.
- D4 Dickson Weatherproof Nail Co., Evanston, Ill.
- E1 Eastern Stainless Steel Corp., Baltimore
- E2 Empire-Reeves Steel Corp., Mansfield, O.
- E3 Enamel Products & Plating Co., McKeesport, Pa.
- F1 Firth Sterling, Inc., McKeesport, Pa.
- F2 Fitzsimons Steel Corp., Youngstown
- F3 Follansbee Steel Corp., Follansbee, W. Va.

- G2 Granite City Steel Co., Granite City, Ill.
- G3 Great Lakes Steel Corp., Detroit
- G4 Greer Steel Co., Dover, O.
- G5 Green River Steel Corp., Owenboro, Ky.
- H1 Hanna Furnace Corp., Detroit
- I2 Ingersoll Steel Div., Chicago
- I3 Inland Steel Co., Chicago
- I4 Interlake Iron Corp., Cleveland
- J1 Jackson Iron & Steel Co., Jackson, O.
- J2 Jessop Steel Corp., Washington, Pa.
- J3 Jones & Laughlin Steel Corp., Pittsburgh
- J4 Joslyn Mfg. & Supply Co., Chicago
- J5 Judson Steel Corp., Emeryville, Calif.
- K1 Kaiser Steel Corp., Fontana, Calif.
- K2 Keystone Steel & Wire Co., Peoria
- K3 Koppers Co., Granite City, Ill.
- K4 Keystone Drawn Steel Co., Spring City, Pa.
- L1 Laclede Steel Co., St. Louis
- L2 La Salle Steel Co., Chicago
- L3 Lone Star Steel Co., Dallas
- L4 Lukens Steel Co., Coatesville, Pa.
- M1 Mahoning Valley Steel Co., Niles, O.
- M2 McLouth Steel Corp., Detroit
- M3 Mercer Tube & Mfg. Co., Sharon, Pa.
- M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
- M6 Mystic Iron Works, Everett, Mass.
- M7 Milton Steel Products Div., Milton, Pa.
- M8 Mill Strip Products Co., Evanston, Ill.
- M9 Moltrup Steel Products Co., Beaver Falls, Pa.
- N1 National Supply Co., Pittsburgh
- N2 National Tube Div., Pittsburgh
- N4 Northwestern Steel & Wire Co., Sterling, Ill.
- N6 Northwest Steel Rolling Mills, Seattle
- N7 Newman Crosby Steel Co., Pawtucket, R. I.
- N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
- N9 Nelson Steel & Wire Co.
- O1 Oliver Iron & Steel Co., Pittsburgh
- O2 Oregon Steel Mills, Portland
- P1 Page Steel & Wire Div., Monessen, Pa.
- P2 Phoenix Steel Corp., Phoenixville, Pa.
- P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
- P4 Pittsburgh Coke & Chemical Co., Pittsburgh
- P5 Pittsburgh Screw & Bolt Co., Pittsburgh
- P6 Pittsburgh Steel Co., Pittsburgh
- P7 Portsmouth Div., Detroit Steel Corp., Detroit
- P8 Plymouth Steel Co., Detroit

- P9 Pacific States Steel Co., Niles, Cal.
- P10 Precision Drawn Steel Co., Camden, N. J.
- P11 Production Steel Strip Corp., Detroit
- P13 Phoenix Mfg. Co., Joliet, Ill.
- P14 Pacific Tube Co.
- P15 Philadelphia Steel and Wire Corp.
- R1 Reeves Steel & Mfg. Div., Dover, O.
- R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
- R3 Republic Steel Corp., Cleveland
- R4 Roebbing Sons Co., John A., Trenton, N. J.
- R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
- R6 Rodney Metals, Inc., New Bedford, Mass.
- R7 Rome Strip Steel Co., Rome, N. Y.
- S1 Sharon Steel Corp., Sharon, Pa.
- S2 Sheffield Steel Div., Kansas City
- S3 Shenango Furnace Co., Pittsburgh
- S4 Simonds Saw and Steel Co., Fitchburg, Mass.
- S5 Sweet's Steel Co., Williamsport, Pa.
- S7 Stanley Works, New Britain, Conn.
- S8 Superior Drawn Steel Co., Monaca, Pa.
- S9 Superior Steel Div. of Copperweld Steel Co., Carnegie, Pa.
- S10 Seneca Steel Service, Buffalo
- S11 Southern Electric Steel Co., Birmingham
- S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
- S13 Seymour Mfg. Co., Seymour, Conn.
- T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
- T2 Tennessee Coal & Iron Div., Fairfield
- T3 Tennessee Products & Chem. Corp., Nashville
- T4 Thomas Strip Div., Warren, O.
- T5 Timken Steel & Tube Div., Canton, O.
- T7 Texas Steel Co., Fort Worth
- T8 Thompson Wire Co., Boston
- U1 United States Steel Corp., Pittsburgh
- U2 Universal Cyclops Steel Corp., Bridgeville, Pa.
- U3 Ulbrich Stainless Steels, Wallingford, Conn.
- U4 U. S. Pipe & Foundry Co., Birmingham
- W1 Wallingford Steel Co., Wallingford, Conn.
- W2 Washington Steel Corp., Washington, Pa.
- W3 Weirton Steel Co., Weirton, W. Va.
- W4 Wheatland Tube Co., Wheatland, Pa.
- W5 Wheeling Steel Corp., Wheeling, W. Va.
- W6 Wickwire Spencer Steel Div., Buffalo
- W7 Wilson Steel & Wire Co., Chicago
- W8 Wisconsin Steel Div., S. Chicago, Ill.
- W9 Woodward Iron Co., Woodward, Ala.
- W10 Wyckoff Steel Co., Pittsburgh
- W12 Wallace Barnes Steel Div., Bristol, Conn.
- Y1 Youngstown Sheet & Tube Co., Youngstown, O.

## PIPE AND TUBING

Base discounts (per) l.o.b. mills. Base price about \$200 per net ton.

| STANDARD<br>T. & C.                | BUTTWELD |        |         |        |       |        |           |        |           |        |       |        | SEAMLESS    |        |        |        |           |        |       |        |             |        |     |      |
|------------------------------------|----------|--------|---------|--------|-------|--------|-----------|--------|-----------|--------|-------|--------|-------------|--------|--------|--------|-----------|--------|-------|--------|-------------|--------|-----|------|
|                                    | 1/2 In.  |        | 3/4 In. |        | 1 In. |        | 1 1/4 In. |        | 1 1/2 In. |        | 2 In. |        | 2 1/2-3 In. |        | 2 In.  |        | 2 1/2 In. |        | 3 In. |        | 3 1/2-4 In. |        |     |      |
|                                    | Bk.      | Gal.   | Bk.     | Gal.   | Bk.   | Gal.   | Bk.       | Gal.   | Bk.       | Gal.   | Bk.   | Gal.   | Bk.         | Gal.   | Bk.    | Gal.   | Bk.       | Gal.   | Bk.   | Gal.   | Bk.         | Gal.   | Bk. | Gal. |
| Sparrows Pt. B3                    | 0.25     | *15.0  | 3.25    | *11.0  | 6.75  | *6.50  | 9.25      | *5.75  | 9.75      | *4.75  | 10.25 | *4.25  | 11.75       | *4.50  |        |        |           |        |       |        |             |        |     |      |
| Youngstown R3                      | 2.25     | *13.0  | 5.25    | *9.0   | 8.75  | *4.50  | 11.25     | *3.75  | 11.75     | *2.75  | 12.25 | *2.25  | 13.75       | *2.50  |        |        |           |        |       |        |             |        |     |      |
| Fontana K1                         | *10.75   | *26.00 | *7.75   | *22.00 | *4.25 | *17.50 | *1.75     | *16.75 | *1.25     | *15.75 | *0.75 | *15.25 | 0.75        | *15.50 |        |        |           |        |       |        |             |        |     |      |
| Pittsburgh J3                      | 2.25     | *13.0  | 5.25    | *9.0   | 8.75  | *4.50  | 11.25     | *3.75  | 11.75     | *2.75  | 12.25 | *2.25  | 13.75       | *2.50  | *12.25 | *27.25 | *5.75     | *22.50 | *3.25 | *20.0  | *1.75       | *18.50 |     |      |
| Alton, Ill. L1                     | 0.25     | *15.0  | 3.25    | *11.0  | 6.75  | *6.50  | 9.25      | *5.75  | 9.75      | *4.75  | 10.25 | *4.25  | 11.75       | *4.50  |        |        |           |        |       |        |             |        |     |      |
| Sharon M3                          | 2.25     | *13.0  | 5.25    | *9.0   | 8.75  | *4.50  | 11.25     | *3.75  | 11.75     | *2.75  | 12.25 | *2.25  | 13.75       | *2.50  |        |        |           |        |       |        |             |        |     |      |
| Fairless N2                        | 0.25     | *15.0  | 3.25    | *11.0  | 6.75  | *6.50  | 9.25      | *5.75  | 9.75      | *4.75  | 10.25 | *4.25  | 11.75       | *4.50  |        |        |           |        |       |        |             |        |     |      |
| Pittsburgh N1                      | 2.25     | *13.0  | 5.25    | *9.0   | 8.75  | *4.50  | 11.25     | *3.75  | 11.75     | *2.75  | 12.25 | *2.25  | 13.75       | *2.50  | *12.25 | *27.25 | *5.75     | *22.50 | *3.25 | *20.0  | *1.75       | *18.50 |     |      |
| Wheeling W5                        | 2.25     | *13.0  | 5.25    | *9.0   | 8.75  | *4.50  | 11.25     | *3.75  | 11.75     | *2.75  | 12.25 | *2.25  | 13.75       | *2.50  |        |        |           |        |       |        |             |        |     |      |
| Wheatland W4                       | 2.25     | *13.0  | 5.25    | *9.0   | 8.75  | *4.50  | 11.25     | *3.75  | 11.75     | *2.75  | 12.25 | *2.25  | 13.75       | *2.50  |        |        |           |        |       |        |             |        |     |      |
| Youngstown Y1                      | 2.25     | *13.0  | 5.25    | *9.0   | 8.75  | *4.50  | 11.25     | *3.75  | 11.75     | *2.75  | 12.25 | *2.25  | 13.75       | *2.50  | *12.25 | *27.25 | *5.75     | *22.50 | *3.25 | *20.0  | *1.75       | *18.50 |     |      |
| Indiana Harbor Y1                  | 1.25     | *14.0  | 4.25    | *10.0  | 7.75  | *5.50  | 10.25     | *4.75  | 10.75     | *3.75  | 11.25 | *3.25  | 12.75       | *3.50  |        |        |           |        |       |        |             |        |     |      |
| Lorain N2                          | 2.25     | *13.0  | 5.25    | *9.0   | 8.75  | *4.50  | 11.25     | *3.75  | 11.75     | *2.75  | 12.25 | *2.25  | 13.75       | *2.50  | *12.25 | *27.25 | *5.75     | *22.50 | *3.25 | *20.0  | *1.75       | *18.50 |     |      |
| <b>EXTRA STRONG<br/>PLAIN ENDS</b> |          |        |         |        |       |        |           |        |           |        |       |        |             |        |        |        |           |        |       |        |             |        |     |      |
| Sparrows Pt. B3                    | 4.75     | *9.0   | 8.75    | *5.0   | 11.75 | *0.50  | 12.25     | *1.75  | 12.75     | *0.75  | 13.25 | *0.25  | 13.75       | *1.50  |        |        |           |        |       |        |             |        |     |      |
| Youngstown R3                      | 6.75     | *7.0   | 10.75   | *3.0   | 13.75 | 1.50   | 14.25     | 0.25   | 14.75     | 1.25   | 15.25 | 1.75   | 15.75       | 0.50   |        |        |           |        |       |        |             |        |     |      |
| Fairless N2                        | 4.75     | *9.0   | 8.75    | *5.0   | 11.75 | *0.50  | 12.25     | *1.75  | 12.75     | *0.75  | 13.25 | *0.25  | 13.75       | *1.50  |        |        |           |        |       |        |             |        |     |      |
| Fontana K1                         | *6.25    | *22.25 |         |        | 0.75  |        | 1.25      |        | 1.75      |        | 2.25  |        | 2.75        |        |        |        |           |        |       |        |             |        |     |      |
| Pittsburgh J3                      | 6.75     | *7.0   | 10.75   | *3.0   | 13.75 | 1.50   | 14.25     | 0.25   | 14.75     | 1.25   | 15.25 | 1.75   | 15.75       | 0.50   | *10.75 | *24.75 | *3.25     | *19.0  | *0.75 | *16.50 | 4.25        | *11.50 |     |      |
| Alton, Ill. L1                     | 4.75     | *9.0   | 8.75    | *5.0   | 11.75 | *0.50  | 12.25     | *1.75  | 12.75     | *0.75  | 13.25 | *0.25  | 13.75       | *1.50  |        |        |           |        |       |        |             |        |     |      |
| Sharon M3                          | 6.75     | *7.0   | 10.75   | *3.0   | 13.75 | 1.50   | 14.25     | 0.25   | 14.75     | 1.25   | 15.25 | 1.75   | 15.75       | 0.50   |        |        |           |        |       |        |             |        |     |      |
| Pittsburgh N1                      | 6.75     | *7.0   | 10.75   | *3.0   | 13.75 | 1.50   | 14.25     | 0.25   | 14.75     | 1.25   | 15.25 | 1.75   | 15.75       | 0.50   | *10.75 | *24.75 | *3.25     | *19.0  | *0.75 | *16.50 | 4.25        | *11.50 |     |      |
| Wheeling W5                        | 6.75     | *7.0   | 10.75   | *3.0   | 13.75 | 1.50   | 14.25     | 0.25   | 14.75     | 1.25   | 15.25 | 1.75   | 15.75       | 0.50   |        |        |           |        |       |        |             |        |     |      |
| Wheatland W4                       | 6.75     | *7.0   | 10.75   | *3.0   | 13.75 | 1.50   | 14.25     | 0.25   | 14.75     | 1.25   | 15.25 | 1.75   | 15.75       | 0.50   |        |        |           |        |       |        |             |        |     |      |
| Youngstown Y1                      | 6.75     | *7.0   | 10.75   | *3.0   | 13.75 | 1.50   | 14.25     | 0.25   | 14.75     | 1.25   | 15.25 | 1.75   | 15.75       | 0.50   | *10.75 | *24.75 | *3.25     | *19.0  | *0.75 | *16.50 | 4.25        | *11.50 |     |      |
| Indiana Harbor Y1                  | 5.75     | *8.0   | 9.75    | *4.0   | 12.75 | 0.50   | 13.25     | *0.75  | 13.75     | 0.25   | 14.25 | 0.75   | 14.75       | 0.50   |        |        |           |        |       |        |             |        |     |      |
| Lorain N2                          | 6.75     | *7.0   | 10.75   | *3.0   | 13.75 | 1.50   | 14.25     | 0.25   | 14.75     | 1.25   | 15.25 | 1.75   | 15.75       | 0.50   | *10.75 | *24.75 | *3.25     | *19.0  | *0.75 | *16.50 | 4.25        | *11.50 |     |      |

Threads only, butt-weld and seamless, 2 1/4 pt. higher discount. Plain ends, butt-weld and seamless, 3-in. and under, 5 1/2 pt. higher discount.  
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: 1/4, 1/2 and 1-in., 1 1/4, 1 1/2 and 2-in., 1 1/2 pt.; 2 1/2 and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2 1/2 and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts.  
East St. Louis zinc price now 11.00¢ per lb.

(Effective April 27, 1959)

## TOOL STEEL

| F.o.b. mill            | W | Cr  | V | Mo | Co | per lb | SAE      |
|------------------------|---|-----|---|----|----|--------|----------|
| 18                     | 4 | 1   | — | —  | —  | \$1.84 | T-1      |
| 18                     | 4 | 1   | — | —  | 5  | 2.545  | T-4      |
| 18                     | 4 | 2   | — | —  | —  | 2.005  | T-2      |
| 1.5                    | 4 | 1.5 | 8 | —  | —  | 1.20   | M-1      |
| 6                      | 4 | 3   | — | —  | —  | 1.59   | M-3      |
| 6                      | 4 | 2   | 5 | —  | —  | 1.345  | M-2      |
| High-carbon chromium   | — | —   | — | —  | —  | .955   | D-3, D-5 |
| Oil hardened manganese | — | —   | — | —  | —  | .505   | O-2      |
| Special carbon         | — | —   | — | —  | —  | .38    | W-1      |
| Extra carbon           | — | —   | — | —  | —  | .38    | W-1      |
| Regular carbon         | — | —   | — | —  | —  | .325   | W-1      |

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

## CLAD STEEL

Base prices, cents per lb f.o.b.

| Cladding | Plate (L4, C4, A3, J2) |        |        | Sheet (J2) |
|----------|------------------------|--------|--------|------------|
|          | 10 pct                 | 15 pct | 20 pct | 20 pct     |
| 302      |                        |        |        | 37.50      |
| 304      | 28.80                  | 31.55  | 34.30  | 40.00      |
| 316      | 42.20                  | 46.25  | 50.25  | 58.75      |
| 321      | 34.50                  | 37.75  | 41.05  | 47.25      |
| 347      | 40.80                  | 44.65  | 48.55  | 57.00      |
| 405      | 24.60                  | 26.90  | 29.25  |            |
| 410      | 22.70                  | 24.85  | 27.00  |            |
| 430      | 23.45                  | 25.65  | 27.90  |            |

CR Strip (S9) Copper, 10 pct, 2 sides, 43.15; 1 side, 36.20.

## RAILS, TRACK SUPPLIES

| F.o.b. Mill<br>Cents Per Lb | No. 1 Std.<br>Rail | Light Rail | Joint Bars | Track Spikes | Tie Plates | Track Bolts<br>Untreated |
|-----------------------------|--------------------|------------|------------|--------------|------------|--------------------------|
| Bessemer U1                 | 5.75               | 6.725      | 7.25       |              |            | 15.35                    |
| Cleveland R3                |                    |            |            | 10.10        |            |                          |
| So. Chicago R3              |                    |            |            |              |            |                          |
| Enslay T2                   | 5.75               | 6.725      |            | 10.10        | 6.875      |                          |
| Fairfield T2                |                    | 6.725      |            |              | 6.875      |                          |
| Gary U1                     | 5.75               |            |            | 10.10        |            |                          |
| Ind. Harbor T3              |                    |            | 7.25       |              |            |                          |
| Johnstown B3                |                    | 6.725      |            |              |            |                          |
| Joliet U1                   |                    |            |            | 10.10        |            |                          |
| Kansas City S2              |                    |            |            | 10.10        |            | 15.35                    |
| Lackawanna B3               | 5.75               | 6.725      | 7.25       |              | 6.875      | 15.35                    |
| Lebanon B3                  |                    |            | 7.25       |              |            | 15.35                    |
| Minneapolis C6              | 5.75               | 7.225      | 7.25       | 10.10        | 6.875      | 15.35                    |
| Pittsburgh P3               |                    |            |            |              |            | 14.75                    |
| Pittsburgh J3               |                    |            |            | 10.10        |            |                          |
| Seattle B2                  |                    |            |            |              | 6.75       | 15.85                    |
| Steelton B3                 | 5.75               |            | 7.25       |              | 6.875      |                          |
| Struthers Y1                |                    |            |            | 10.10        |            |                          |
| Torrance C7                 |                    |            |            |              | 6.75       |                          |
| Williamsport S5             |                    | 6.725      |            |              |            |                          |
| Youngstown R3               |                    |            |            | 10.10        |            |                          |

## COKE

| Furnace, beehive (f.o.b.) | Net-Ton            |
|---------------------------|--------------------|
| Connellsville, Pa.        | \$14.50 to \$15.50 |
| Foundry, beehive (f.o.b.) | \$18.50            |
| Foundry oven coke         |                    |
| Buffalo, del'd            | \$33.25            |
| Detroit f.o.b.            | 32.00              |
| New England, del'd        | 33.55              |
| New Haven, f.o.b.         | 31.00              |
| Kearney, N. J., f.o.b.    | 31.25              |
| Philadelphia, f.o.b.      | 31.00              |
| Swedeland, Pa., f.o.b.    | 31.00              |
| Painesville, Ohio, f.o.b. | 34.35              |
| Erie, Pa., f.o.b.         | 32.00              |
| Cleveland, del'd          | 34.19              |
| Cincinnati, del'd         | 32.84              |
| St. Paul, f.o.b.          | 31.25              |
| St. Louis, f.o.b.         | 33.00              |
| Birmingham, f.o.b.        | 30.35              |
| Milwaukee, f.o.b.         | 32.00              |
| Neville Is., Pa.          | 30.75              |

## LAKE SUPERIOR ORES

|  |         |
|--|---------|
| 51.50% Fe natural, delivered lower Lake ports. Interim prices for 1959 season. Freight changes for seller's account. |         |
| Gross Ton  |         |
| Openhearth lump  | \$12.70 |
| Old range, bessemer  | 11.85   |
| Old range, nonbessemer   | 11.70   |
| Mesabi, bessemer   | 11.60   |
| Mesabi, nonbessemer  | 11.45   |
| High phosphorus  | 11.45   |

## ELECTRICAL SHEETS

| 22-Gage<br>F.o.b. Mill<br>Cents Per Lb | Hot-Rolled<br>(Cat<br>Lengths)* | Cold-Reduced<br>(Coiled or Cut Length) |                    |
|--|---------------------------------|--|--------------------|
|  |                                 | Semi-<br>Processed                     | Fully<br>Processed |
| Field                                  |                                 | 9.875                                  |                    |
| Armature                               | 11.70                           | 11.20                                  | 11.70              |
| Elect.                                 | 12.40                           | 11.90                                  | 12.40              |
| Special Motor                          |                                 | 12.475                                 |                    |
| Motor                                  | 13.55                           | 13.05                                  | 13.55              |
| Dynamo                                 | 14.65                           | 14.15                                  | 14.65              |
| Trans. 72                              | 15.70                           | 15.20                                  | 15.70              |
| Trans. 65                              | 16.30                           |  |                    |
|  |                                 | Grain Oriented                         |                    |
| Trans. 58                              | 16.80                           | Trans. 80                              | 19.70              |
| Trans. 52                              | 17.85                           | Trans. 73                              | 20.20              |
|  |                                 | Trans. 66                              | 20.70              |

Producing points: Aliquippa (J3); Beech Bottom (W5); Brackenridge (A3); Granite City (G2); Indiana Harbor (I3); Mansfield (E2); Newport, Ky. (A9); Niles, O. (S1); Vandergrift (U1); Warren, O. (R3); Zanesville, Butler (A7).

## ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

| GRAPHITE       |                 |       | CARBON*        |                 |       |
|----------------|-----------------|-------|----------------|-----------------|-------|
| Diam.<br>(In.) | Length<br>(In.) | Price | Diam.<br>(In.) | Length<br>(In.) | Price |
| 24             | 84              | 27.25 | 40             | 100, 110        | 12.50 |
| 20             | 72              | 26.50 | 35             | 110             | 11.20 |
| 18             | 72              | 27.50 | 30             | 110             | 11.70 |
| 14             | 72              | 27.25 | 24             | 72              | 11.95 |
| 12             | 72              | 28.25 | 20             | 90              | 11.55 |
| 10             | 60              | 29.50 | 17             | 72              | 12.10 |
| 10             | 48              | 30.00 | 14             | 72              | 12.55 |
| 7              | 60              | 29.75 | 10             | 60              | 13.80 |
| 6              | 60              | 33.25 | 8              | 60              | 14.25 |
| 4              | 40              | 37.00 |                |                 |       |
| 3              | 40              | 39.25 |                |                 |       |
| 2½             | 30              | 41.50 |                |                 |       |
| 2              | 24              | 64.00 |                |                 |       |

\* Prices shown cover carbon nipples.

## REFRACTORIES

## Fire Clay Brick

| Super duty, Mo., Pa., Md., Ky.             | Carloads per 1000 |
|--|-------------------|
| High duty (except Salina, Pa., add \$5.00) | \$185.00          |
| Medium duty                                | 140.00            |
| Low duty (except Salina, Pa., add \$2.00)  | 125.00            |
| Ground fire clay, net ton, bulk...         | 103.00            |
|  | 22.50             |

## Silica Brick

|   |               |
|---|---------------|
| Mt. Union, Pa., Ensley, Ala.                              | \$158.00      |
| Childs, Hays, Latrobe, Pa.                                | 163.00        |
| Chicago District  | 168.00        |
| Western Utah  | 183.00        |
| California  | 165.00        |
| Super Duty  |               |
| Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville | 163.00-168.00 |
| Silica cement, net ton, bulk, Latrobe                     | 29.75         |
| Silica cement, net ton, bulk, Chicago                     | 26.75         |
| Silica cement, net ton, bulk, Ensley, Ala.                | 27.75         |
| Silica cement, net ton, bulk, Mt. Union                   | 25.75         |
| Silica cement, net ton, bulk, Utah and Calif.             | 39.00         |

## Chrome Brick

| Standard chemically bonded, Balt.           | Per net ton |
|---|-------------|
| Standard chemically bonded, Curtner, Calif. | \$109.00    |
| Burned, Balt.                               | 119.00      |
|   | 103.00      |

## Magnesite Brick

|                              |          |
|------------------------------|----------|
| Standard, Baltimore          | \$140.00 |
| Chemically bonded, Baltimore | 119.00   |

## Grain Magnesite

|  |             |
|--|-------------|
| St. % to ¼-in. grains                        |             |
| Domestic, f.o.b. Baltimore in bulk           | \$73.00     |
| Domestic, f.o.b. Chewah, Wash., Luning, Nev. |             |
| In bulk                                      | 46.00       |
| In sacks                                     | 52.00-54.00 |

## Dead Burned Dolomite

| Per net ton                       |         |
|-----------------------------------|---------|
| F.o.b. bulk, producing points in: |         |
| Pa., W. Va., Ohio                 | \$16.75 |
| Missouri Valley                   | 15.60   |
| Midwest                           | 17.00   |

(Effective April 27, 1959)

## MERCHANT WIRE PRODUCTS

| F.o.b. Mill        | Col   | Col | Col | Col  | Col  | Col    | Col   | Col | Col |
|--------------------|-------|-----|-----|------|------|--------|-------|-----|-----|
| Alabama City R3    | 173   | 187 | 212 | 193  | 9.00 | 9.55   |       |     |     |
| Aliquippa J3***    | 173   | 190 | 212 | 193  | 9.00 | 9.55   |       |     |     |
| Atlanta A3**       | 175   | 192 | 214 | 198  | 8.75 | 9.425  |       |     |     |
| Bartonsville K2**  | 175   | 192 | 214 | 198  | 9.10 | 9.275  |       |     |     |
| Buffalo W6         |       |     |     |      | 9.00 | 9.55*  |       |     |     |
| Chicago N4**       | 177   | 190 | 212 | 196  | 9.00 | 9.70   |       |     |     |
| Chicago R3         |       |     |     |      | 9.00 | 9.55   |       |     |     |
| Cleveland A6       |       |     |     |      |      |        |       |     |     |
| Cleveland A5       |       |     |     |      | 9.00 |        |       |     |     |
| Crawfords M4**     | 175   | 192 | 214 | 198  | 9.10 | 9.775  |       |     |     |
| Donora, Pa. A3     | 173   | 187 | 212 | 193  | 9.00 | 9.55   |       |     |     |
| Duluth A5          | 173   | 187 | 212 | 193  | 9.00 | 9.55   |       |     |     |
| Fairfield, Ala. T2 | 173   | 187 | 212 | 193  | 9.00 | 9.55   |       |     |     |
| Galveston D4       | 9.10  |     |     |      |      |        |       |     |     |
| Houston S2         | 178   | 192 | 217 | 198  | 9.25 | 9.80   |       |     |     |
| Jacksonville M4    | 184-1 | 197 | 219 | 203  | 9.10 | 9.775  |       |     |     |
| Johnstown B3**     | 173   | 190 | 217 | 196  | 9.00 | 9.675  |       |     |     |
| Joliet, Ill. A5    | 173   | 187 | 212 | 193  | 9.00 | 9.55   |       |     |     |
| Kokomo C9          | 175   | 189 | 214 | 195* | 9.10 | 9.65*  |       |     |     |
| L. Angeles B2**    |       |     |     |      | 9.95 | 10.425 |       |     |     |
| Kansas City S2*    | 178   | 192 | 217 | 198* | 9.25 | 9.80   |       |     |     |
| Minneapolis C6     | 178   | 192 | 217 | 198* | 9.25 | 9.80   |       |     |     |
| Monessen P6        |       |     |     |      | 193  | 8.65   | 9.325 |     |     |
| Palmer, Mass. W6   |       |     |     |      |      | 9.30   | 9.85* |     |     |
| Pittsburg, Cal. C7 | 192   | 210 |     | 213  | 9.60 | 10.15  |       |     |     |
| Rankin, Pa. A5     | 173   | 187 |     | 193  | 9.00 | 9.55   |       |     |     |
| So. Chicago R3     | 173   | 187 |     | 193  | 8.65 | 9.20   |       |     |     |
| S. San Fran. C6    |       |     | 236 |      | 9.95 | 10.50  |       |     |     |
| Sparrows Pt. B3**  | 175   |     | 214 | 198  | 9.10 | 9.775  |       |     |     |
| Struthers, O. Y1*  |       |     |     |      | 8.65 | 9.20   |       |     |     |
| Worcester A5       | 179   |     |     |      | 9.30 | 9.85   |       |     |     |
| Williamsport S5    |       |     |     |      |      |        |       |     |     |

\* Zinc less than .10%. \*\*\* .10% zinc.  
\*\* 11-12% zinc. † Plus zinc extras.  
‡ Wholesalers only.

## C-R SPRING STEEL

| Cents Per Lb<br>F.o.b. Mill | CARBON CONTENT |           |           |           |           |
|-----------------------------|----------------|-----------|-----------|-----------|-----------|
|                             | 0.26-0.41      | 0.41-0.61 | 0.61-0.81 | 0.81-1.06 | 1.06-1.35 |
| Anderson, Ind. G4           | 8.95           | 10.40     | 12.60     | 15.60     | 18.55     |
| Baltimore, Md. T8           | 9.50           | 10.70     | 12.90     | 15.90     | 18.85     |
| Bristol, Conn. W12          |                | 10.70     | 12.90     | 16.10     | 19.30     |
| Boston T8                   | 9.50           | 10.70     | 12.90     | 15.90     | 18.85     |
| Buffalo, N. Y. R7           | 8.95           | 10.40     | 12.60     | 15.60     | 18.55     |
| Carnegie, Pa. S9            | 8.95           | 10.40     | 12.60     | 15.60     | 18.55     |
| Cleveland A5                | 8.95           | 10.40     | 12.60     | 15.60     | 18.55     |
| Dearborn S1                 | 9.05           | 10.50     | 12.70     |           |           |
| Detroit D1                  | 9.05           | 10.50     | 12.70     | 15.70     |           |
| Detroit D2                  | 9.05           | 10.50     | 12.70     |           |           |
| Dover, O. G4                | 8.95           | 10.40     | 12.60     | 15.60     | 18.55     |
| Evanston, Ill. M8           | 9.05           | 10.40     | 12.60     |           |           |
| Franklin Park, Ill. T8      | 9.05           | 10.40     | 12.60     | 15.60     | 18.55     |
| Harrison, N. J. C11         | 9.10           | 10.55     | 12.60     | 15.60     | 18.55     |
| Indianapolis R5             | 11.15          | 12.60     | 14.80     | 17.80     |           |
| Los Angeles C1              | 9.40           | 10.70     | 12.90     | 15.90     | 18.85     |
| New Britain, Conn. S7       | 8.95           | 10.40     | 12.60     | 15.60     |           |
| New Castle, Pa. B4          | 9.40           | 10.70     | 12.90     | 15.90     |           |
| New Haven, Conn. D1         | 9.50           | 10.70     | 12.90     | 15.90     | 18.85     |
| Pawtucket, R. I. N7         | 9.05           | 10.40     | 12.60     | 15.60     | 18.55     |
| Riverdale, Ill. A1          | 8.95           | 10.40     | 12.60     | 15.60     | 18.55     |
| Sharon, Pa. S1              | 9.50           | 10.70     | 12.90     | 15.90     | 18.85     |
| Trenton, R4                 | 9.40           | 10.70     | 12.90     | 15.90     | 18.85     |
| Wallingford W1              | 8.95           | 10.40     | 12.60     | 15.60     | 18.55     |
| Warren, Ohio T4             | 9.50           | 10.70     | 12.90     | 15.90     | 18.85     |
| Worcester, Mass. A5         | 9.50           | 10.70     | 12.90     | 15.90     | 18.85     |
| Youngstown R5               | 9.10           | 10.55     | 12.60     | 15.60     | 18.55     |

## BOILER TUBES

| \$ per 100 ft.<br>cut 10 to 24 ft.<br>F.o.b. Mill | Size       |             | Seamless |        | Elec.<br>Weld |
|---|------------|-------------|----------|--------|---------------|
|   | OD-<br>In. | B.W.<br>Gs. | H.R.     | C.D.   | H.R.          |
| Babcock & Wilcox                                  | 2          | 13          | 40.28    | 47.21  | 35.22         |
|   | 2½         | 12          | 54.23    | 63.57  | 47.43         |
|   | 3          | 12          | 62.62    | 73.40  | 54.77         |
|   | 3½         | 11          | 73.11    | 85.70  | 63.93         |
|   | 4          | 10          | 97.08    | 113.80 | 85.53         |
| National Tube                                     | 2          | 13          | 40.28    | 47.21  | 35.22         |
|   | 2½         | 12          | 54.23    | 63.57  | 47.43         |
|   | 3          | 12          | 62.62    | 73.40  | 54.77         |
|   | 3½         | 11          | 73.11    | 85.70  | 63.93         |
|   | 4          | 10          | 97.08    | 113.80 | 85.53         |
| Pittsburgh Steel                                  | 2          | 13          | 40.28    | 47.21  |               |
|   | 2½         | 12          | 54.23    | 63.57  |               |
|   | 3          | 12          | 62.62    | 73.40  |               |
|   | 3½         | 11          | 73.11    | 85.70  |               |
|   | 4          | 10          | 97.08    | 113.80 |               |

## METAL POWDERS

Cents per lb, minimum truckload, delivered E. of Miss. River, unless otherwise noted.

### Iron Powders

#### Compacting Powders

|                                |                |
|--------------------------------|----------------|
| Electrolytic, imported, f.o.b. | 29.50 to 33.00 |
| Electrolytic, domestic         | 34.50          |
| Sponge                         | 11.25          |
| Atomized                       | 11.25          |
| Hydrogen Reduced               | 11.25 to 12.00 |
| Carbonyl                       | 88.00          |
| Welding Powders*               | 8.10           |
| Cutting and Scarfing Powders*  | 9.10           |

### Copper Powders

|  |                        |
|--|------------------------|
| Electrolytic, domestic                   | 41.00                  |
| Precipitated                             | 40.50 to 45.00         |
| Atomized                                 | 39.80 to 48.30         |
| Hydrogen reduced, f.o.b.                 | 43.25                  |
| Bronze                                   | 47.20 to 51.50         |
| Chromium, electrolytic                   | \$5.00                 |
| Lead                                     | 19.00                  |
| Manganese, f.o.b.                        | 42.00                  |
| Molybdenum                               | \$3.60 to \$3.95       |
| Nickel                                   | \$1.05 to \$1.03       |
| Nickel Silver                            | 53.50                  |
| Nickel Steel                             | 13.00                  |
| Solder                                   | 13¢ plus metal value   |
| Stainless Steel, 302                     | \$1.07                 |
| Stainless Steel, 316                     | \$1.26                 |
| Steel, atomized, prealloyed, 4600 series | 14.00 plus metal value |
| Tin                                      | 14¢ plus metal value   |
| Titanium, 99.25+%, per lb., f.o.b.       | \$11.25                |
| Tungsten                                 | \$3.15 (nominal)       |

\* F.O.B., shipping point.

## BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Pct. Discounts

| Bolts  | 1-4 Containers | 5 Containers | 20,000 Lb. | 40,000 Lb. |
|--|----------------|--------------|------------|------------|
| <b>Machine</b>   |                |              |            |            |
| 1/2" and smaller x 3" and shorter  | 55             | 57           | 61         | 62         |
| 1/2" diam. x 3" and shorter  | 47             | 49 1/2       | 54         | 55         |
| 1/2" thru 1" diam x 6" and shorter   | 37             | 39 1/2       | 45         | 46         |
| 1/2" thru 1" diam. longer than 6" and 1 1/2" and larger x all lengths                                  | 31             | 34           | 40         | 41         |
| Rolled thread, 1/2" and smaller x 3" and shorter   | 55             | 57           | 61         | 62         |
| Carriage, lag, plow, tap, blank, step, elevator and fitting up bolts 1/2" and smaller x 6" and shorter | 48             | 50 1/2       | 55         | 56         |

Note: Add 25 pct for less than container quantity. Distributor prices are 5 pct less on bolts and square nuts.

| Nuts, Hex, HP reg. & hvy.        | Full case or Keg price |
|----------------------------------|------------------------|
| 1/2" in. or smaller              | 62                     |
| 1/2" in. to 1 1/2" in. inclusive | 56                     |
| 1 1/2" in. and larger            | 51 1/2                 |

### C. P. Hex, reg. & hvy.

|                                  |        |
|----------------------------------|--------|
| 1/2" in. or smaller              | 62     |
| 1/2" in. to 1 1/2" in. inclusive | 56     |
| 1 1/2" in. and larger            | 51 1/2 |

### Hot Galv. Hex Nuts (All Types)

|                      |    |
|----------------------|----|
| 1/2" in. and smaller | 41 |
|----------------------|----|

### Semi-finished Hex Nuts

|                                  |        |
|----------------------------------|--------|
| 1/2" in. or smaller              | 62     |
| 1/2" in. to 1 1/2" in. inclusive | 56     |
| 1 1/2" in. and larger            | 51 1/2 |

(Add 25 pct for broken case or keg quantities)

### Finished

|                      |    |
|----------------------|----|
| 1/2" in. and smaller | 65 |
|----------------------|----|

### Rivets

|                      |                         |
|----------------------|-------------------------|
| 1/2" in. and larger  | Base per 100 lb \$12.85 |
| 7/16 in. and smaller | Pct. Off List 15        |

### Cop Screws

|                              |  |
|------------------------------|--|
| New std. hex head, pack-aged | Discount (Packages) Full Finished H. C. Heat Treat Full Case |
|------------------------------|--|

|   |    |    |
|---|----|----|
| 1/2" diam. and smaller x 6" and shorter   | 54 | 42 |
| 1/2", 3/4", and 1" diam. x 6" and shorter   | 38 | 23 |
| 1/2" diam. and smaller x longer than 6"   | .. | .. |
| 1/2", 3/4", and 1" diam. x longer than 6"   | .. | .. |
| 1/2" through 1" dia. x 6" and shorter   | 59 | 48 |
| 1/2" through 1" dia. x 6" and shorter   | 45 | 32 |
| Minimum quantity—1/2" through 3/4" diam., 15,000 pieces; 7/16" through 1/2" diam., 5,000 pieces; 3/4" through 1" diam., 2,000 pieces. |    |    |

### Machine Screws & Stove Bolts

| Plain Finish       | Discount | Mach. Screws | Stove Bolts |
|--------------------|----------|--------------|-------------|
| Cartons            | 60       | 60           | 60          |
| Bulk               |          |              |             |
| To 1/2"            | Quantity |              |             |
| 25,000-and over    | 60       | ..           | ..          |
| incl. 5/16 to 1/2" |          |              |             |
| 15,000-200,000     | 60       | ..           | ..          |
| incl.              |          |              |             |

### Machine Screws & Stove Bolt Nuts

| Hex                  | Square                |
|----------------------|-----------------------|
| 16                   | 19                    |
| In Cartons           | Quantity              |
| In Bulk              |                       |
| 1/2" diam. & smaller | 25,000-and over 15 16 |

## STEEL SERVICE CENTERS

Metropolitan Price, dollars per 100 lb.

| Cities             | City<br>Delivery &<br>Charge | Sheets                        |                          |                          | Strip      | Plates | Shapes                 | Bars                     |                   | Alloy Bars                      |                                |                                 |                                |
|--------------------|------------------------------|-------------------------------|--------------------------|--------------------------|------------|--------|------------------------|--------------------------|-------------------|---------------------------------|--------------------------------|---------------------------------|--------------------------------|
|                    |                              | Hot-Rolled<br>(16 ga. & liv.) | Cold-Rolled<br>(15 gage) | Galvanized<br>(10 gage)† | Hot-Rolled |        | Standard<br>Structural | Hot-Rolled<br>(merchant) | Cold-<br>Finished | Hot-Rolled<br>4615<br>As rolled | Hot-Rolled<br>4140<br>Annealed | Cold-Drawn<br>4615<br>As rolled | Cold-Drawn<br>4140<br>Annealed |
| Atlanta.....       |                              | 8.59                          | 9.87                     | 10.13                    | 8.91       | 9.29   | 9.40                   | 9.39                     | 13.24*            |                                 |                                |                                 |                                |
| Baltimore.....     | \$ 10                        | 8.65                          | 9.35                     | 9.09                     | 9.15       | 9.10   | 9.65                   | 9.55                     | 11.80*            | 16.28                           | 15.28                          | 19.82                           | 19.08                          |
| Birmingham.....    |                              | 8.18                          | 9.45                     | 10.46                    | 8.51       | 8.89   | 9.00                   | 8.99                     |                   |                                 |                                |                                 |                                |
| Boston.....        | 10                           | 10.22                         | 10.50                    | 12.07                    | 11.27      | 10.42  | 10.79                  | 10.34                    | 13.45*            | 16.79                           | 15.79                          | 20.29                           | 19.54                          |
| Buffalo.....       | 15                           | 8.55                          | 9.75                     | 11.00                    | 8.90       | 9.35   | 9.40                   | 9.30                     | 11.60*            | 16.34                           | 15.55                          | 19.01                           | 19.30                          |
| Chicago.....       | 15                           | 8.40                          | 9.60                     | 11.05                    | 8.66       | 9.04   | 9.15                   | 9.14                     | 9.30              | 16.20                           | 15.20                          | 19.70                           | 18.95                          |
| Cincinnati.....    | 15                           | 8.58                          | 9.65                     | 11.10                    | 8.98       | 9.42   | 9.71                   | 9.46                     | 11.68*            | 16.52                           | 15.52                          | 20.02                           | 19.27                          |
| Cleveland.....     | 15                           | 8.51                          | 9.60                     | 11.15                    | 8.78       | 9.28   | 9.54                   | 9.25                     | 11.40*            | 16.31                           | 15.31                          | 19.81                           | 19.06                          |
| Denver.....        | 20                           | 9.60                          | 11.84                    | 12.94                    | 9.63       | 9.96   | 10.04                  | 10.00                    | 11.19             |                                 |                                |                                 | 20.84                          |
| Detroit.....       | 15                           | 8.66                          | 9.85                     | 11.40                    | 9.03       | 9.41   | 9.71                   | 9.45                     | 9.66              | 15.46                           | 15.46                          | 18.81                           | 19.23                          |
| Houston.....       |                              | 8.10                          | 8.60                     |                          | 8.15       | 8.45   | 8.05                   | 8.10                     | 11.60             | 16.20                           | 15.25                          | 19.65                           | 18.95                          |
| Kansas City.....   | 15                           | 9.02                          | 10.27                    | 11.37                    | 9.33       | 9.71   | 9.82                   | 9.81                     | 10.22             | 16.87                           | 15.87                          | 20.37                           | 19.62                          |
| Los Angeles.....   |                              | 8.70*                         | 11.20-<br>11.80          | 12.20                    | 9.15       | 9.10   | 9.00                   | 9.10                     | 12.95             | 17.30                           | 16.35                          | 21.30                           | 20.60                          |
| Memphis.....       | 15                           | 8.55                          | 9.80                     |                          | 8.60       | 8.93   | 9.01                   | 8.97                     | 12.11*            |                                 |                                |                                 |                                |
| Milwaukee.....     | 15                           | 8.54                          | 9.73                     | 11.19                    | 8.80       | 9.18   | 9.37                   | 9.28                     | 9.54              | 16.34                           | 15.34                          | 19.84                           | 19.09                          |
| New York.....      | 10                           | 9.27                          | 10.59                    | 11.40                    | 9.74       | 9.87   | 9.84                   | 10.09                    | 13.35*            | 16.16                           | 15.60                          | 20.10                           | 19.35                          |
| Norfolk.....       | 20                           | 8.20                          |                          |                          | 8.90       | 8.65   | 9.20                   | 8.90                     | 10.70             |                                 |                                |                                 |                                |
| Philadelphia.....  | 10                           | 8.30                          | 9.35                     | 10.71                    | 9.35       | 9.25   | 9.20                   | 9.50                     | 12.05*            | 16.58                           | 15.58                          | 20.08                           | 19.33                          |
| Pittsburgh.....    | 15                           | 8.50-<br>8.60                 | 9.70-<br>9.95            | 11.05                    | 8.76       | 9.05   | 9.15                   | 9.14                     | 11.40*            | 16.20                           | 15.20                          | 19.70                           | 18.95                          |
| Portland.....      |                              | 10.00†                        | 11.75†                   | 13.30†                   | 11.95†     | 11.50† | 11.10†                 | 9.85†                    | 15.30*            | 18.50                           | 17.45                          | 20.75                           | 20.25                          |
| San Francisco..... | 10                           | 9.75                          | 11.20*                   | 11.50                    | 9.85       | 10.10  | 9.95                   | 10.25                    | 13.70             | 17.05                           | 16.35                          | 21.05                           | 20.60                          |
| Seattle.....       |                              | 10.30                         | 11.55                    | 12.50                    | 10.25      | 10.10  | 10.20                  | 10.50                    | 14.70             | 17.15                           | 16.80                          | 20.65                           | 20.60                          |
| Spokane.....       | 15                           | 10.45                         | 11.70                    | 12.45                    | 10.65      | 10.25  | 10.35                  | 11.15                    | 14.85             | 17.75                           | 16.95                          | 21.55                           | 20.75                          |
| St. Louis.....     | 15                           | 8.78                          | 9.98                     | 11.43                    | 9.04       | 9.42   | 9.63                   | 9.52                     | 9.93              | 16.58                           | 15.58                          | 20.68                           | 19.33                          |
| St. Paul.....      | 15                           | 8.94                          | 10.19                    | 11.64                    | 8.99       | 9.45   | 9.53                   | 9.70*                    | 10.16             |                                 | 15.41                          |                                 | 19.21                          |

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. \*All sizes except 18 and 16 ga. †10¢ zinc. ‡Deduct for country delivery. \*C1018—1 in. rounds. †10 ga. x 36" x 120"; ‡20 ga. x 36" x 120"; ‡26 ga. x 30" x 96"; ‡43" x 1" in lots of 1000 to 9999; ‡sheared plate 1/4" x 84" in lots of 1000 to 9999; ‡3" x 5.70" in lots of 1000 to 9999; ‡M-1020—1-in. rounds in lots of 1000 to 9999; ‡15 ga. & heavier; ‡14 ga. & lighter.

(Effective April 27, 1959)



## PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

| Producing Point   | Basic | Fdry. | Mall. | Bess. | Low Phos. |
|-------------------|-------|-------|-------|-------|-----------|
| Ashtabula, Pa. B6 | 68.00 | 68.50 | 69.00 | 69.50 | .....     |
| Birmingham R3     | 62.00 | 62.50 | 63.00 | 63.50 | .....     |
| Birmingham W9     | 62.00 | 62.50 | 63.00 | 63.50 | .....     |
| Birmingham U4     | 62.00 | 62.50 | 63.00 | 63.50 | .....     |
| Buffalo R3        | 66.00 | 66.50 | 67.00 | 67.50 | .....     |
| Buffalo H1        | 66.00 | 66.50 | 67.00 | 67.50 | .....     |
| Buffalo W6        | 66.00 | 66.50 | 67.00 | 67.50 | .....     |
| Chester P2        | 66.00 | 66.50 | 67.00 | 67.50 | .....     |
| Chicago P2        | 66.00 | 66.50 | 67.00 | 67.50 | .....     |
| Chicago I4        | 66.00 | 66.50 | 67.00 | 67.50 | .....     |
| Cleveland A5      | 66.00 | 66.50 | 67.00 | 67.50 | 71.00     |
| Cleveland R3      | 66.00 | 66.50 | 67.00 | 67.50 | .....     |
| Duluth I4         | 66.00 | 66.50 | 67.00 | 67.50 | 71.00     |
| Erie I4           | 66.00 | 66.50 | 67.00 | 67.50 | 71.00     |
| Everett M6        | 67.00 | 67.50 | 68.00 | 68.50 | .....     |
| Fontana K1        | 75.00 | 75.50 | 76.00 | 76.50 | .....     |
| Geneva, Utah C7   | 66.00 | 66.50 | 67.00 | 67.50 | .....     |
| Granite City G2   | 67.00 | 67.50 | 68.00 | 68.50 | .....     |
| Hubbard V1        | 66.00 | 66.50 | 67.00 | 67.50 | .....     |
| Ironton, Utah C7  | 66.00 | 66.50 | 67.00 | 67.50 | .....     |
| Midland C11       | 66.00 | 66.50 | 67.00 | 67.50 | .....     |
| Minnesota C6      | 68.00 | 68.50 | 69.00 | 69.50 | .....     |
| Monessen P6       | 66.00 | 66.50 | 67.00 | 67.50 | 71.00     |
| Neville Is. P4    | 66.00 | 66.50 | 67.00 | 67.50 | 71.00     |
| N. Tonawanda T1   | 66.00 | 66.50 | 67.00 | 67.50 | .....     |
| Sharpville S3     | 66.00 | 66.50 | 67.00 | 67.50 | .....     |
| So. Chicago R3    | 66.00 | 66.50 | 67.00 | 67.50 | .....     |
| So. Chicago W8    | 66.00 | 66.50 | 67.00 | 67.50 | .....     |
| Swedeland A2      | 68.00 | 68.50 | 69.00 | 69.50 | .....     |
| Toledo I4         | 66.00 | 66.50 | 67.00 | 67.50 | .....     |
| Troy, N. Y. R3    | 68.00 | 68.50 | 69.00 | 69.50 | 73.00     |
| Youngstown Y1     | ..... | ..... | ..... | ..... | .....     |

**DIFFERENTIALS:** Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, 32¢ per ton for 0.50 to 0.75 pct nickel, 31¢ for each additional 0.25 pct nickel. Add \$1.00 for 0.31-0.69 pct phos.

Silvery Iron: Buffalo (6 pct), H1, \$79.25; Jackson J1, I4 (Globe Div.), \$78.00; Niagara Falls (15.01-15.50), \$101.00; Kokuk (14.01-14.50), \$103.50; (15.51-16.00), \$106.50. Add \$1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add \$1.25 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under 10 pct phos.), \$64.00. Add \$1.00 premium for all grades silvery to 18 pct.

† Intermediate low phos.

## STAINLESS STEEL

Base price cents per lb. f.o.b. mill

| Product            | 201   | 202   | 301   | 302   | 303   | 304   | 316   | 321   | 347   | 403   | 410   | 416   | 430   |
|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Ingots, re-rolled  | 22.75 | 24.75 | 24.00 | 26.25 | —     | 28.00 | 41.25 | 33.50 | 38.50 | —     | 17.50 | —     | 17.75 |
| Slabs, billets     | 28.00 | 31.50 | 29.00 | 32.75 | 33.25 | 34.50 | 51.25 | 41.50 | 48.25 | —     | 22.25 | —     | 22.50 |
| Billets, forging   | —     | 37.75 | 38.75 | 39.50 | 42.50 | 42.00 | 64.50 | 48.75 | 57.75 | 29.25 | 29.25 | 29.75 | 29.75 |
| Bars, struct.      | 43.50 | 44.50 | 46.00 | 46.75 | 49.75 | 49.50 | 75.75 | 57.50 | 67.25 | 35.00 | 35.00 | 35.50 | 35.50 |
| Plates             | 39.25 | 40.00 | 41.25 | 42.25 | 45.00 | 45.75 | 71.75 | 54.75 | 64.75 | 30.00 | 30.00 | 31.25 | 31.00 |
| Sheets             | 48.50 | 49.25 | 51.25 | 52.00 | 56.75 | 55.00 | 80.75 | 65.50 | 79.25 | 40.25 | 40.25 | 48.25 | 40.75 |
| Strip, hot-rolled  | 36.00 | 39.00 | 37.25 | 40.50 | —     | 44.25 | 69.25 | 53.50 | 63.50 | —     | 31.00 | —     | 32.00 |
| Strip, cold-rolled | 45.00 | 49.25 | 47.50 | 52.00 | 56.75 | 55.00 | 80.75 | 65.50 | 79.25 | 40.25 | 40.25 | 42.50 | 40.75 |
| Wire CF; Rod HR    | —     | 42.25 | 43.50 | 44.25 | 47.25 | 47.00 | 71.75 | 54.50 | 63.75 | 33.25 | 33.25 | 33.75 | 33.75 |

### STAINLESS STEEL PRODUCING POINTS:

**Sheets:** Midland, Pa., C11; Brackenridge, Pa., A3; Butler, Pa., A7; Vandergrift, Pa., U1; Washington, Pa., W2, J2; Baltimore, E1; Middletown, O., A7; Massillon, O., R3; Gary, U1; Bridgeville, Pa., U2; New Castle, Ind., I2; Detroit, M2; Louisville, O., R5.

**Strip:** Midland, Pa., C11; Waukegan, Cleveland, A5; Carnegie, Pa., S9; McKeesport, Pa., F1; Reading, Pa., C2; Washington, Pa., W2; W. Leeburg, Pa., A3; Bridgeville, Pa., U2; Detroit, M2; Detroit, S1; Canton, Massillon, O., R3; Harrison, N. J., D3; Youngstown, R5; Sharon, Pa., S1; Butler, Pa., A7; Wallingford, Conn., U3 (plus further conversion extras); W1 (25¢ per lb. higher); Seymour, Conn., S13, (25¢ per lb. higher); New Bedford, Mass., R6; Gary, U1, (25¢ per lb. higher).

**Bar:** Baltimore, A7; S. Duquesne, Pa., U1; Munhall, Pa., U1; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., J2; McKeesport, Pa., U1, F1; Bridgeville, Pa., U2; Dunkirk, N. Y., A3; Massillon, O., R5; S. Chicago, U1; Syracuse, N. Y., C11; Watervliet, N. Y., A3; Waukegan, A5; Canton, O., T5, R3; Ft. Wayne, I4; Detroit, R5; Gary, U1; Owensboro, Ky., G5; Bridgeport, Conn., N8; Ambridge, Pa., B7.

**Wire:** Waukegan, A5; Massillon, O., R3; McKeesport, Pa., F1; Ft. Wayne, J4; Newark, N. J., D2; Harrison, N. J., D3; Baltimore, A7; Dunkirk, A3; Monessen, P1; Syracuse, C11; Bridgeville, U2; Detroit, R5.

**Structurals:** Baltimore, A7; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracuse, C11; S. Chicago, U1.

**Plates:** Ambridge, Pa., B7; Baltimore, E1; Brackenridge, Pa., A3; Chicago, U1; Munhall, Pa., U1; Midland, Pa., C11; New Castle, Ind., I2; Middletown, A7; Washington, Pa., J2; Cleveland, Massillon, R3; Coatesville, Pa., C15; Vandergrift, Pa., U1; Gary, U1.

**Forging billets:** Ambridge, Pa., B7; Midland, Pa., C11; Baltimore, A7; Washington, Pa., J2; McKeesport, F1; Massillon, Canton, O., R3; Watervliet, A3; Pittsburgh, Chicago, U1; Syracuse, C11; Detroit, R5; Munhall, Pa., S. Chicago, U1; Owensboro, Ky., G5; Bridgeport, Conn., N8.

(Effective April 27, 1959)

# RITCO FORGINGS

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ANNIVERSARY

# FERROALLOY PRICES

## Ferrochrome

|  |       |             |       |
|--|-------|-------------|-------|
| Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, 30-1.00% max. Si. |       |             |       |
| 0.02% C....  | 41.00 | 0.50% C.... | 38.00 |
| 0.05% C....  | 39.00 | 1.00% C.... | 37.75 |
| 0.10% C....  | 38.50 | 1.50% C.... | 37.50 |
| 0.20% C....  | 38.25 | 2.00% C.... | 37.25 |
| 4.00-4.50% C, 60-70% Cr, 1-2% Si.  |       |             | 28.75 |
| 3.50-5.00% C, 57-64% Cr, 2.00-1.50% Si.  |       |             | 28.25 |
| 0.025% C (Simplex)   |       |             | 36.75 |
| 8% max C, 50-55% Cr, 6% max Si.  |       |             | 25.75 |
| 4 1/2% max C, 50-55% Cr, 2% max Si.  |       |             | 26.50 |

## High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

## Chromium Metal

|  |        |
|--|--------|
| Per lb chromium, contained, packed, delivered, ton lots, 97.25% min. Cr, 1% max. Fe. |        |
| 0.10% max. C   | \$1.29 |
| 9 to 11% C, 88-91% Cr, 0.75% Fe...   | 1.38   |

## Electrolytic Chromium Metal

|  |        |
|--|--------|
| Per lb of metal 2" x D plate (1/4" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max. |        |
| Carloads   | \$1.15 |
| Ton lots   | 1.17   |
| Less ton lots  | 1.19   |

## Low Carbon Ferrochrome Silicon

|   |       |       |  |
|---|-------|-------|--|
| (Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in. x down, packed. |       |       |  |
| Price is sum of contained Cr and contained Si.  |       |       |  |
|   | Cr    | Si    |  |
| Carloads, bulk  | 28.25 | 14.60 |  |
| Ton lots  | 33.50 | 16.05 |  |
| Less ton lots   | 35.10 | 17.70 |  |

## Calcium-Silicon

|   |       |
|---|-------|
| Per lb of alloy, lump, delivered, packed, 30-33% Cr, 60-65% Si, 3.00 max. Fe. |       |
| Carloads, bulk  | 24.00 |
| Ton lots  | 27.95 |
| Less ton lots   | 29.45 |

## Calcium-Manganese-Silicon

|   |       |
|---|-------|
| Cents per lb of alloy, lump, delivered, packed. |       |
| 16-20% Ca, 14-18% Mn, 53-59% Si.                |       |
| Carloads, bulk                                  | 23.00 |
| Ton lots  | 26.15 |
| Less ton lots                                   | 27.15 |

## SMZ

|   |       |
|---|-------|
| Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe 1/2 in. x 12 mesh. |       |
| Ton lots  | 21.15 |
| Less ton lots   | 22.40 |

## V Foundry Alloy

|  |       |
|--|-------|
| Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed. |       |
| Carload lots   | 18.45 |
| Ton lots   | 19.95 |
| Less ton lots  | 21.20 |

## Graphidox No. 4

|  |       |
|--|-------|
| Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%. |       |
| Carload packed   | 19.20 |
| Ton lots to carload packed   | 21.15 |
| Less ton lots  | 22.40 |

## Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn.

|   |  |              |
|---|--|--------------|
| Producing Point   |  | Cents per-lb |
| Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore. |  | 12.25        |
| Johnstown, Pa.  |  | 12.25        |
| Neville Island, Pa.   |  | 12.25        |
| Sheridan, Pa.   |  | 12.25        |
| Philo, Ohio   |  | 12.25        |
| S. Duquesne   |  | 12.25        |
| Add or subtract 0.1¢ for each 1 pct Mn above or below base content.     |  |              |
| Briquets, delivered, 66 pct Mn:   |  |              |
| Carloads, bulk  |  | 14.80        |
| Ton lots packed in bags   |  | 17.20        |

## Spiegeleisen

|  |         |          |
|--|---------|----------|
| Per gross ton, lump, f.o.b. Palmerton,<br>Pa., and Neville Island, Pa. |         |          |
| Manganese  | Silicon |          |
| 16 to 19%  | 3% max. | \$109.50 |
| 19 to 21%  | 3% max. | 102.50   |
| 21 to 23%  | 3% max. | 105.00   |

## Manganese Metal

|  |       |
|--|-------|
| 2 in. x down, cents per pound of metal delivered.      |       |
| 95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe. |       |
| Carload, packed  | 45.75 |
| Ton lots   | 47.25 |

## Electrolytic Manganese

|  |       |
|--|-------|
| F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound. |       |
| Carloads   | 34.00 |
| Ton lots   | 36.00 |
| 250 to 1999 lb   | 38.00 |
| Premium for Hydrogen - removed metal   | 0.75  |

## Medium Carbon Ferromanganese

|  |       |
|--|-------|
| Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn |       |
|  | 25.50 |

## Low-Carb Ferromanganese

|   |          |       |       |
|---|----------|-------|-------|
| Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%. |          |       |       |
|   | Carloads | Ton   | Less  |
| 0.07% max. C, 0.06% (Bulk)  |          |       |       |
| P, 90% Mn   | 37.15    | 39.95 | 41.15 |
| 0.07% max. C  | 35.10    | 37.90 | 39.10 |
| 0.10% max. C  | 34.35    | 37.15 | 38.35 |
| 0.15% max. C  | 33.60    | 36.40 | 37.60 |
| 0.30% max. C  | 32.10    | 34.90 | 36.10 |
| 0.50% max. C  | 31.60    | 34.40 | 35.60 |
| 0.75% max. C, 80.85% Mn, 5.0-7.0% Si                              | 28.60    | 31.40 | 32.60 |

## Silicomanganese

|  |       |
|--|-------|
| Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point. |       |
| Carloads bulk  | 12.80 |
| Ton lots, packed   | 14.45 |
| Carloads, bulk, delivered, per lb of briquet   | 15.10 |
| Briquets, packed pallets, 3000 lb up to carloads   | 16.30 |

## Silvery Iron (electric furnace)

|  |  |
|--|--|
| Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00. |  |
|--|--|

## Silicon Metal

|   |          |          |
|---|----------|----------|
| Cents per pound contained Si, lump size, delivered, packed. |          |          |
|   | Ton lots | Carloads |
| 98.25% Si, 0.50% Fe.  | 24.95    | 23.65    |
| 98% Si, 1.0% Fe   | 24.45    | 23.15    |

## Silicon Briquets

|  |       |
|--|-------|
| Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets. |       |
| Carloads, bulk   | 8.00  |
| Ton lots, packed   | 10.80 |

## Electric Ferrosilicon

|   |       |
|---|-------|
| Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point. |       |
| 50% Si....  | 14.60 |
| 75% Si....  | 16.90 |
| 85% Si....  | 18.60 |
| 90% Si....  | 20.00 |

## Ferrovanadium

|  |      |
|--|------|
| 50-55% V delivered, per pound, contained V, in any quantity. |      |
| Openhearth   | 3.20 |
| Crucible   | 3.30 |
| High speed steel   | 3.40 |

## Calcium Metal

|  |        |          |           |
|--|--------|----------|-----------|
| Eastern zone, cents per pound of metal, delivered. |        |          |           |
|  | Cast   | Turnings | Distilled |
| Ton lots   | \$2.05 | \$2.95   | \$3.75    |
| 100 to 1999 lb.                                    | 2.40   | 3.30     | 4.55      |

(Effective April 27, 1959)

## Alaifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.

|                |        |
|----------------|--------|
| Carloads, bulk | 9.85¢  |
| Ton lots       | 11.20¢ |

## Calcium molybdate, 43.6-46.6% f.o.b. Langloeth, Pa., per pound contained Mo

|  |        |
|--|--------|
|  | \$1.50 |
|--|--------|

## Ferrocolumbium, 50-60% lb, 2 in. x D, delivered per pound contained Cb.

|               |        |
|---------------|--------|
| Ton lots      | \$3.90 |
| Less ton lots | 3.95   |

## Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta

|  |        |
|--|--------|
|  | \$3.40 |
|--|--------|

## Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langloeth, Pa., per pound contained Mo.

|  |        |
|--|--------|
|  | \$1.76 |
|--|--------|

## Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$5.00 unitage, per gross ton

|                         |          |
|-------------------------|----------|
| 10 tons to less carload | \$120.00 |
|                         | \$131.00 |

## Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti

|  |        |
|--|--------|
|  | \$1.35 |
|--|--------|

## Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti

|               |        |
|---------------|--------|
|               | \$1.50 |
| Less ton lots | \$1.54 |

## Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton

|  |          |
|--|----------|
|  | \$240.00 |
|--|----------|

## Ferrotungsten, 1/4 x down packed, per pounds contained W, ton lots delivered

|  |                  |
|--|------------------|
|  | \$2.15 (nominal) |
|--|------------------|

## Molybde oxide, briquets per lb contained Mo, f.o.b. Langloeth, Pa.

|  |        |
|--|--------|
|  | \$1.49 |
|--|--------|

## bags, f.o.b. Washington, Pa., Langloeth, Pa.

|  |        |
|--|--------|
|  | \$1.38 |
|--|--------|

## Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

|                       |        |
|-----------------------|--------|
| Carload, bulk lump    | 18.50¢ |
| Ton lots, packed lump | 20.50¢ |
| Less ton lots         | 21.00¢ |

## Vanadium oxide, 86-89% V<sub>2</sub>O<sub>5</sub> per pound contained V<sub>2</sub>O<sub>5</sub>

|  |        |
|--|--------|
|  | \$1.38 |
|--|--------|

## Zirconium silicon, per lb of alloy 35-40% del'd, carloads, bulk, 12-15% del'd lump, bulk-carloads

|  |        |
|--|--------|
|  | 26.25¢ |
|  | 9.25¢  |

## Boron Agents

### Borasil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B

|                 |        |
|-----------------|--------|
| 2000 lb carload | \$5.50 |
|-----------------|--------|

### Bortram, f.o.b. Niagara Falls.

|                          |     |
|--------------------------|-----|
| Ton lots per pound       | 45¢ |
| Less ton lots, per pound | 50¢ |

### Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.

|                    |        |
|--------------------|--------|
| Ton lots per pound | 14.00¢ |
|--------------------|--------|

### Ferroboration, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots...

|  |  |
|--|--|
| F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up |  |
|--|--|

|             |      |
|-------------|------|
| 10 to 14% B | .85  |
| 14 to 19% B | 1.20 |
| 19% min. B  | 1.50 |

### Grainal, f.o.b. Cambridge, O., freight, allowed, 100 lb and over No. 79

|  |        |
|--|--------|
|  | \$1.05 |
|  | 50¢    |

### Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

|                        |        |
|------------------------|--------|
| Ton lots (packed)      | \$1.46 |
| Less ton lots (packed) | 1.67   |

### Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots

|  |      |
|--|------|
|  | 2.15 |
|--|------|



Inspection of 75-foot Salem Rotary Hearth Furnace at The Timken Roller Bearing Company plant at Canton, Ohio.

## Rotary hearth roof of B&W IFB gives nine years of service at the Timken Company

Installed as a replacement for a super-duty firebrick sprung arch, over 35,000 B&W Insulating Firebrick were used in the roof of this rotary hearth furnace. Since installation nine years ago, just 300 9" equivalents have been used for maintenance—less than 1% replacement!

Throughout this period the furnace has been operated at temperatures

ranging from 2100 F to 2300 F on a continuous 6-day cycle at an average output of 20 tons per hour.

In addition to long service life, lightweight B&W Insulating Firebrick provide high fuel savings because of their low heat flow and heat storage. Lightweight IFB also simplify original furnace construction...make maintenance and patching easier.

For more information on long-lasting, cost cutting B&W Insulating Firebrick, consult your B&W Refractories Representative or send for Bulletin R-2-H.

### B&W REFRACTORIES PRODUCTS:

B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick  
B&W Insulating Firebrick • B&W Refractory Castables, Plastics and  
Mortars • B&W Silicon Carbide • B&W Ramming Mixes • B&W Kaowool





## RAILWAY EQUIPMENT

FOR SALE

Used "As Is" and Reconditioned

### RAILWAY CARS

All Types

SERVICE-TESTED  
FREIGHT CAR REPAIR  
PARTS

For All Types of Cars

AMERICAN DIESEL LOCOMOTIVE CRANE  
30-Ton; Complete with Generator.  
New 1948

3, G.E. DIESEL-ELECTRIC LOCOMOTIVES  
44-Ton Standard Gauge  
In ICC Operating Condition

### STANDARD GAUGE CARS

10 Covered Hopper Cars  
70-Ton Capacity

Ore Hopper Cars  
660 Cubic Feet  
40- AND 50-TON CAPACITY

### RAILWAY TANK CARS and STORAGE TANKS

6,000- 8,000- and 10,000-Gallon  
Cleaned and Tested

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"ANYTHING containing IRON or STEEL"

## REBUILT—GUARANTEED ELECTRICAL EQUIPMENT

### STEEL MILL SPECIALS

(1) 2200 H.P. Westinghouse motor, 600  
V.D.C., 92/132 R.P.M.

(1) 1250 H. P., Allis Chalmers Motor, 600  
V.D.C., 300/600 R.P.M.

(2) 600 H. P., Allis Chalmers Motors, 600  
V.D.C., 300/600 R.P.M.

(3) 3500 K.W., Allis Chalmers Motor Gen-  
erator sets, 350/700 V.D.C. with 5000  
H.P., 13800/6900 V motor & control

(1) 1875 K.W., Whse. motor generator set  
250 V.D.C., with 2700 H.P., motor  
13800/6900 V and control

(1) 1250 K.V.A. Whse. Hi-Cycle Frequency  
Set, 800 V., 960 cycle, with 1875 H.P.,  
2300 V., syn motor complete with all  
switch gear

### T. B. MAC CABE COMPANY

4302 Clarissa St., Philadelphia 40, Penna.

Cable Address Phone

"Macsteel" Philadelphia, Pa. Davenport 4-8300

## THE CLEARING HOUSE

# How to Get Started Selling Presses

Several years ago Max Wender of Detroit bought a stock of presses from the Navy.

Now his firm has found an attractive sales pay-off specializing in presses.

■ First quarter sales of used machinery showed substantial improvement over the same period of last year, according to many dealers in the Detroit area. While sales activity hasn't reached the boom levels of several years ago, dealers are encouraged because the pick-up is not restricted to any particular industry or locality.

**Success Story**—An example of how to make the most of the rising tide might be found in the operations of Max Wender, of Wender Presses, Inc., Detroit, who says his business was never better. Tongue-in-cheek, he adds, "I don't know what I'd do if business got any better." Wender's first quarter sales were greater than all of last year—a year which he calls "good."

The Wender firm has been specializing in presses for the past two years, although it handles other tools as well. It started specializing when Mr. Wender bought most of the presses in a naval ordnance plant that had been producing shells. The equipment was all late-model, cosmoline and mothballed by the Navy.

**Caretaker to Tenant**—To avoid extensive moving expense, Mr. Wender agreed to act as caretaker for the building. This not only pro-

vided ample storage and display space for the equipment, but provided the services of overhead cranes suitable for handling the largest presses. When the building was sold, the Wender firm remained as tenant.

To move the large stock of presses—the machinery firm is buying 2 or 3 for every one it now sells—the firm has started an extensive national advertising program. Its present advertising budget is currently around \$5,000 per month. If this sounds like a lot, Mr. Wender says it is paying off in sales.

Only about 10 pct to 20 pct of his business is done locally; the remainder comes from centers such as Cleveland, St. Louis, Los Angeles, San Francisco—and South America.

**Latin Lines**—Mr. Wender says the South American market for used machinery is growing rapidly in importance as more and more U. S. companies open or expand plants in those countries. Other dealers also report selling an increasing number of machinery parts in South America. Usually it's production goods rather than toolroom equipment for job shops.

**Cheaper to Rebuild**—For example, an automotive parts company recently brought several presses for a parts plant in Brazil—a \$100,000 deal. The machines, to be part of a synchronized line, required modifications to obtain synchronized speeds—at an additional cost of nearly \$100,000.

# CONSIDER GOOD USED EQUIPMENT FIRST

## BENDING ROLLS

10' x 10 Ga. Bertsch No. 6 Initial Type  
12' x 10 Ga. Bertsch No. 6 Initial Type  
14' x 13 1/2" Bertsch Initial Type—LATE  
32' x 1/2" BALDWIN PYRAMID TYPE—LATE

## BRAKE—LEAF TYPE

12' x 1/2" Dreis & Krump

## BRAKE—PRESS TYPE

90 ton Niagara, Model 90-8-10

## CRANES—OVERHEAD ELECTRIC TRAVELING

3 ton P&H 40' Span 220 Volt D.C.  
3 ton P&H 57' Span 220/3/60 A.C.  
8 ton P&H 35' Span 220/3/60 A.C.  
10 ton P&H 39' Span 220 Volt D.C.  
10 ton Milwaukee 57' Span 220 Volt D.C.  
10 ton Shaw 48' Span 220 Volt D.C.  
10 ton Whiting 73' Span 220/3/60 A.C.  
10 ton Shaw 120' Span 220 Volt D.C.  
15 ton N-H-P 100' Span 220/3/60 A.C.  
39 ton Shaw 70' Span 220 Volt D.C.  
120 ton Niles 77' Span 220/3/60 A.C.  
120 ton Shepard Niles 77' Span 220/3/60 A.C.

## CRANES—TRAMRAIL TRAVELING

56 ft. Bridge, Three 215 ft. Runways  
82 ft. Bridge, Four Runway 215' & 135'  
Motors 208 Volt 3 Phase 60 Cycle

## DRAW BENCHES

7,000 lb. Draw Bench, 51 ft. Draw  
10,000 lb. Draw Bench, 50 ft. Draw  
35,000 lb. Draw Bench, 41 ft. Draw

## FORGING MACHINES

12' to 5' Acme, Ajax National

## FURNACES—HEAT TREATING

Electric Furnace Co. Batch Type, Max Load 10,000#

Effective Hearth Area 10' x 12' 6" x 40" hi.

## HAMMERS—BOARD DROP—STEAM DROP—STEAM

FORGING 800 lb. to 12,000 lb. Incl.

## LATHE

24" Swing x 48" Monarch Model 22GM—New 1942

## LEVELERS—ROLLER

50' Processor & Leveler, Capacity 50' x .109"

60' Guide 17 Rolls 4 1/2" Dia.

72' Leveler 17 Rolls 2 1/2" Backed Up

## MULTI SLIDE MACHINE

No. 35 U.S. Multi-Slide, Max. Capy. 4 1/2" wide x .089

## NIBBLER

Pullmax Model 2, Capacity 11/32"

## PRESSES—HYDRAULIC

300 ton Southwark, Bed 58" x 28", Stroke 25"

500 ton Watson Stillman Piercing Press, 48" x 72"

500 ton HPM Fastraverse, Bed 36" x 36"

600 ton Birdsboro, Platen 48 x 48", Stroke 13"

1000 ton Southwark, Bed 44" x 54", Stroke 20"

4500 ton B-L-H Bed 68 x 68", Stroke 40"

## PRESSES—STRAIGHT SIDE

215 ton Clearing, Bed Area 36 x 42", Stroke 24"

600 ton Clearing Model K-1600-36, 4" Stroke Bed

36"x36", Air Clutch, Dual H.P. & Speed

900 ton Hamilton 4E-1809, Bed 101x181", Stroke 30"

## PUNCH & SHEAR COMBINATIONS

1 1/2" Buffalo Universal Ironworker

EF Cleveland, 60" Throat Capacity 1 1/4" x 1"

23 Killing, 30" Throat Capacity 1-3/4" x 1"

Rock River Double End, 24" Throat, Capy. 1 1/4" x 1"

## ROLLING MILLS

3 1/2" x 7" Six Roll Cluster Mill

10" x 14" Single Stand Two High

10" x 24" Two Stand Two High

20" x 30" Single Stand Two High

26" x 60" Single Stand Two High

10" Morgan Merchant Mill

12" x 32" Birdsboro 3-Hi Roll Mill

22" x 40" Lewis 3-Hi Sheet Mill

## ROLLS—FORMING

6 Stand Dahlstrom #450-6 for stock to 4 1/2" wide

18 Stand Custom Built, 2 1/2" Shaft, will take 30" wide

## ROLL—PLATE STRAIGHTENING

72" McKay, 20 Rolls 15" Dia. Infeed & Outfeed

Rolls, 150 H.P. Main Drive Motor

## SHEAR—GATE

8' x 1" RD Wood Hydraulic

## SHEAR LINE

38" Hallden Drum Type, Capy. 33-38 Ga.

## SHEAR—ROTARY

No. 22A Quickwork Whiting 3/16" Capacity

## SHEARS—SQUARING

8' x 14 Ga. Edwards, Motor Drive—LATE

10' x 10 Ga. Wyssong & Miles

10' x 1/2" Niagara #810

12' x 3/16" Cincinnati #1412

## SLITTER

24" Torrington Slitting Line, 3 1/2" Arbor

## STRAIGHTENERS

Torrington #1734 12-Roll, Capy. 1 1/4", Rd. 1-9/16"

1/2" Shuster Straightener, 12 Ft. Cut-off

## SWAGING MACHINE

26A Penn. Capy. 3 1/2" Tube, 1 1/4" Solid, 10" Dia

Length, With Hydraulic Feed

## TESTING MACHINES

20,000 lb. Baldwin Univ. Hydraulic

50,000 lb. Olsen 3-Screw Beam Type Universal

80,000 lb. Southwark-Emery Universal Hydraulic

500,000 lb. Olsen, Super Deluxe Compression

## WIRE DRAWING MACHINES

Type B Morgan 4-Block Capy. 2 1/2" Rod down

Scudder 3-Block 20 Dia.

Superior 7-Drift Cone Type, Capy. 14 Ga. down

Vauglin 5 Block, Ea. block M.D. capy. 2 down

Manufacturing

**A. T. HENRY & COMPANY, INC.**

50 CHURCH ST., NEW YORK CITY 8

Telephone COlumbia 7-3437

Equipment

## Confidential Certified Appraisals

Liquidations—Bona Fide Auction Sales Arranged

24" x 28" Handey Geared Head Lathe, M.D.  
22 1/2" Centers  
42" King Vert. Boring Mill, R.H. Swivel Head  
L.H. Turret Hd., Side Hd., M.D.  
No. 1/2, No. 1 1/2 Buffalo Univ. Ironworkers, M.D.  
400 Ton Southwark Hyd. Inclined Wheel Press  
6' x 1/4" Lown Initial Bending Roll M.D.

## FALK MACHINERY COMPANY

16 Ward St., Baker 5-5887, Rochester 5, N. Y.

## GUARANTEED—RE-NU-BILT

## Electric Power Equipment—A. C. Motors

### 3 phase—60 cycle

| Qu. | H.P. | Make    | Type        | Volts    | Speed |
|-----|------|---------|-------------|----------|-------|
| 1   | 1750 | G.E.    | M-679018    | 4800     | 1800  |
| 1   | 1500 | G.E.    | MT          | 6600     | 1187  |
| 1   | 800  | Whas.   | CW          | 550      | 1778  |
| 1   | 700  | A.C.    |             | 2300     | 500   |
| 1   | 600  | Whas.   | CW-4-32D-15 | 440      | 1778  |
| 1   | 500  | G.E.    | MT-413      | 2200     | 439   |
| 1   | 500  | Whas.   | CW          | 550      | 350   |
| 1   | 200  | G.E.    | IM          | 440/2200 | 580   |
| 1   | 125  | G.E.    |             |          |       |
| 1   | 100  | unssed  | MT-537      | 220/440  | 1200  |
| 1   | 100  | G.E.    | MT-584      | 440/2200 | 450   |
| 1   | 250  | G.E.    | IM-413      | 220/440  | 875   |
| 1   | 250  | G.E.    | MT563Y      | 220/440  | 875   |
| 1   | 250  | A.C.    | Any         | 550      | 600   |
| 1   | 250  | White   | CW          | 2200     | 450   |
| 1   | 250  | Cr. Wh. | Sino 29Q    | 2200     | 350   |
| 1   | 250  | G.E.    | MT-424Y     | 4000     | 257   |
| 1   | 250  | G.E.    | IE-13B      | 220      | 1800  |
| 2   | 200  | Whas.   | CW-890      | 2200     | 1775  |
| 2   | 200  | Whas.   | CW-674D     | 220/440  | 885   |
| 1   | 200  | Cr. Wh. | SB-26QB     | 440      | 805   |
| 2   | 200  | G.E.    | IM-17A      | 2200     | 435   |
| 2   | 100  | A.C.    |             | 440      | 695   |

### SQUIRREL CAGE

|   |     |       |             |          |         |
|---|-----|-------|-------------|----------|---------|
| 3 | 100 | Whas. | B.R. CS-607 | 220/440  | 1780    |
| 1 | 800 | G.E.  | RT-575      | 2200     | 1180    |
| 1 | 500 | G.E.  | PT-559AY    | 2200     | 3600    |
| 2 | 500 | Whas. | CS-1115     | 3300     | 863/445 |
| 4 | 500 | Whas. | CS-1216     | 2200     | 500     |
| 1 | 400 | Whas. | CS-7151-    |          |         |
| 1 | 300 | Whas. | CS-1002     | 2300/440 | 690     |
| 3 | 200 | Whas. | CS-855B     |          |         |
| 1 | 150 | G.E.  | PT-558      | 2200     | 875     |
| 1 | 150 | Whas. | CS          | 440      | 580     |
| 1 | 125 | Whas. | CS-764C     | 220/440  | 1180    |
| 2 | 100 | Whas. | CS-760C     | 2200/440 | 1180    |

### SYNCHRONOUS

|   |      |       |             |                |      |
|---|------|-------|-------------|----------------|------|
| 1 | 6000 | G.E.  | ATI 8       |                |      |
| 1 | 3500 | G.E.  | TS 1.0      | 2200/6000      | 600  |
| 1 | 2500 | Whas. | P.P.F.      | 4600/2300/4000 | 380  |
| 1 | 2000 | G.E.  | ATI         | 2300           | 720  |
| 2 | 1750 | G.E.  | ATI         | 2300           | 8600 |
| 1 | 1750 | G.E.  | TS          | 2300/4600      | 900  |
| 1 | 1750 | G.E.  | ATI         | 2300/1200      | 600  |
| 2 | 750  | G.E.  | TS 8P.F.    | 2200           | 1280 |
| 1 | 350  | Whas. | 1.0P.F.     | 440            | 980  |
| 2 | 350  | G.E.  | ATI 1.0P.F. | 2200           | 150  |
| 1 | 325  | G.E.  | ATI 1.0P.F. | 440            | 1800 |

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## FOR SALE

1—8" Diameter x 10" Face 2-Hi Cold Mill

1—3" Rd. Cap. Open End Vertical Bar Shear

1—2 3/4" Cap. Buffalo Billet Shear

1—5-Roll Abramson Tube Straightener 3/4" to 3" O.D. Tube

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3519-21 BEGELOW BOULEVARD, PITTSBURGH 13, PA.

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## COMPLETE STRIP ROLLING MILL

Late Type, Still Set-Up In Plant

BLISS 4 Stand Tandem, continuous strip mill, rolls 16" diameter x 24" face, Individual 250 h.p. D.C. variable speed motors & controls. Equipped with motor driven recoller.

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THE SIGN OF QUALITY—THE MARK OF DEPENDABILITY

## SNAG GRINDERS

7 1/2" H.P. United States Elec. Tool Co. Double End, Model 80, new

Type No. 50—7 1/2" H.P. Standard Elec. Tool Co.

Double End, m.d.

25 H.P. U. S. Elec. Co., Heavy Duty Double End, m.d.

## THREAD GRINDERS

No. 33 Excello Precision, m.d.

## TOOL & CUTTER GRINDERS

No. 91A Coval Universal, m.d.

Pratt & Whitney Deep Hole Drill Sharpener, m.d.

No. 1 Heald Tool Sharpener, m.d.

No. 2A Wm. Sellers Universal Tool Grinder, m.d.

No. 28 Sellers Wet Drill Grinder, m.d.

No. 4T Sellers Tool, m.d., latest

No. 5T Sellers, m.d.

No. 6G Sellers, m.d.

12" Gleason Spiral Bevel, Gear Cutter Sharpener, m.d.

No. 13 Gleason Cutter Sharpener, m.d., late

No. 13 Brown & Sharpe Universal, m.d.

No. 4-4 Barber-Colman Hob Sharpener, m.d.

Sundstrand Tool Grinder, m.d.

12x28" Landis Universal & Tool Grinder, m.d.

## UNIVERSAL GRINDERS

12x36" Landis Type LC Universal, m.d.

14x36" Norton, m.d.

14"x48" Landis Type C, m.d.

14x72" Norton Universal Hydraulic, m.d.

## HONE MACHINES

No. 3 Barnes Single Spindle Internal Hone, new

No. 182 Barnesdrill, m.d.

No. 854 Micromatic Vertical Honing Machine, m.d.

H1 Micromatic Horizontal Hydrohoner, m.d.

H4 Micromatic Horizontal Hydrohoner, m.d.

No. 306H Barnes Twin Spindle

No. 224B Barnes Honing Machine, m.d.

Model MA Sunnen Bench Type, m.d.

## KEYSEATERS

Morton, m.d., thru reversing gear box

Taylor & Fenn Horizontal Shaving, Shaping

Keyseating, m.d., 1942

W-L-W Machine Keyseater, new

We carry an average stock of 2,000 machines in our 11 acre plant at Cincinnati. Visitors welcome at all times

## THE EASTERN MACHINERY COMPANY

1002 Tennessee Avenue, Cincinnati 29, Ohio

MElrose 1241 "TWX" CI 174

CABLE ADDRESS—EMCO

# ROLLING MILLS — STEEL WORKS EQUIPMENT

1—AUTOMATIC COOLING BED FOR BARS up to 2" dia. consists of run-in table, cascade section, shuffler bar section, runout table, with all electric, 200 ft. long.  
1—24" x 52" x 77" TANDEM COLD REDUCTION MILL, 4-high, 3 stands.  
1—18" x 40" x 42" TANDEM COLD REDUCTION MILL, 4-high, 5 stands.  
1—28" x 40" HOT STRIP MILL, 2-high, reversing, with 2500 HP D.C. motor generator, etc.  
1—25" x 42" x 66" HOT STRIP MILL, 4-high.  
1—24" x 36" 2-HIGH MILL driven by 400 HP motor, 4600/3/60.  
1—22" x 36" 2-HIGH MILL driven by 600 HP motor, 4600/3/60.  
1—16" x 22" COLD MILL, 2-high.  
1—8" x 10" COLD MILL including uncoiler, recoiler and edging rolls.  
2—28" 3-HIGH ROLL STANDS.  
1—New 16" BAR MILL, one 3-high roll stand, pinion stand.

1—New 12" BAR MILL, four 3-high stands, pinion stand.  
1—12" MERCHANT BAR MILL with 18" roughing mill and heating furnace.  
1—9" BAR MILL, 3-high.  
2—MORGAN TRAVELING TILTING TABLES for 24" 3-high bar mill.  
1—34" x 192" ROLL GRINDER.  
2—65-TON ELECTRIC MELTING FURNACE, TOP CHARGE, with all electrical and mechanical equipment, including 15,000 KVA and 13,333 KVA transformers.  
1—New top-charge ELECTRIC MELTING FURNACE with 2000 KVA transformer 13,200 volts, 3 phase, 60 cycle.  
2—PACK FURNACES or hot sheet mills 62" x 60" double chamber.  
1—ROLL LATHE, ENCLOSED HEADSTOCK, up to 36" dia. rolls.  
1—OPEN HEARTH CHARGING MACHINE, 5 ton capacity, 11' track gauge.  
1—MAGNETIC SEPARATOR double pulleys, Stearns.

1—BLOWER, Sturtevant, size & form P.  
1—SIDE TRIMMER, Strojine, maximum width 48", makes 2 cuts 3/16" mild steel.  
1—SHUSTER STRAIGHTENING AND CUTTING MACHINE, cap. 1" rd.  
1—TORRINGTON SLAB MILLING machine, capacity 1 1/4" thick x 18" wide.  
1—HALLDEN STRAIGHTENING and cutting-off machine, capacity .562" brass rod.  
1—POINTER for tubes 2" O.D. x 1/4" wall maximum.  
1—UNITED HOT SAW, 50" dia. blade sliding frame, 4'8" stroke.  
1—PROCESSOR AND LEVELER, average gauge .109" 50" wide, 100 to 600 FPM.  
1—DRAWBENCH, 30,000 lb., length 29 ft.  
1—3000 HP GEAR DRIVE, ratio 500 to 75.7 RPM.  
1—3000 HP GEAR DRIVE, ratio 500 to 95.8 RPM.  
1—3000 HP GEAR DRIVE, ratio 16.2 to 1.  
1—1200 HP GEAR DRIVE, ratio 5.92 to 1.  
1—1200 HP GEAR DRIVE, 333 to 94.6 RPM, 3.73 to 1 ratio.  
1—3500 HP MOTOR, 11000/6000 volts, 3 phase, 60 cycle, 514 RPM, synchronous, never used.

## FRANK B. FOSTER, INC.

2220 Oliver Building, Pittsburgh 22, Pa.  
Cable: "Foster, Pittsburgh" Telephone Atlantic 1-2780

### PLANT CLEARANCE!

- Buildings Must Be Vacated!!
- High Grade Forging
- And Press Equipment

BOLT HEAD TRIMMERS: Waterbury Farrell #2, 3/8" cap.; #3, 1/2" cap.  
FURNACES: Swindell-Dresser Continuous Chain Annealing Model C-2400-8; Eaton Elec. Hardening; Leeds & Northrup Elec. Hump.  
HAMMERS: Chambersburg 1500#, 2000#, 2500# Model F; 2500# Type F Board Drop; Bradley 80# Helve, 200# Upright Strap.  
LATHES: Walcott 18"x54" QCG Engine.  
MILLERS: Cincinnati #2 Univ.; Hendey-Norton #3 Plain.  
PLANERS: Cincinnati 24"x24"x5" dble housing; Putnam-Detrick & Harvey 36"x36"x10" Openside.  
PRESSES—END FLYWHEEL TYPE: Bliss #2A adj. bed horn hole, 1 1/2" str. 25 tons; Bliss Stiles #5, 2 3/4" str. 50 tons; Consolidated #32, 2 1/2" str. 50 tons; Ferracute P-3, 1 1/2" str. 35 tons; Toledo #34, 1 1/2" str. 50 tons; #35, 1 3/4" str. 70 tons; Long & Allstatter #2, 1 1/4" str.; #6, 3/4" str.; #7, 5/8" str.  
PRESSES—O.B.I.: Adriance #6, 2 1/4" str. 40 tons.  
PRESSES—ADJ. BED HORNING: Consolidated #23, 2"-2 1/2" str. 22 tons.  
PRESSES—REDUCING GAP FRAME: Bliss #61 Single Crank, 4" str., 25 tons; 4—Bliss #62 Single Crank, 5" str., 30 tons; 7" str., 8" str.  
PRESSES—OPEN BACK GAP FRAME: Garrison 2" str. 32 tons; Consolidated #72, 3" str. 32 tons; #73, 5" str. 50 tons; #76, 6" str. 93 tons.  
PRESSES—STRAIGHT SIDE, SINGLE CRANK: Bliss #85, 9 3/4" str. 84 tons; #305, 4" str. 93 tons; #76-1/2, 11" str. 190 tons; #308A, 14" str. 440 tons; Consolidated #63, 7 1/2" str. 45 tons; #56-1/2, 6" str. 135 tons; Toledo #55, 6" str. 75 tons; #59, 4 1/2" str. 345 tons; Minster #40, 6" str. 85 tons; National #3 Maxi-Press, 6" str. 800 tons; Waterbury Farrell 3" str. 135 tons.  
PRESSES—STRAIGHT SIDE, DOUBLE CRANK: Toledo #92D, 9" str. 75 tons; Ferracute #5303, 4" str. 300 tons.  
PRESSES—STRAIGHT SIDE TRIMMING: Bliss #73-1/2, 5 3/4" str. 58 tons; #74, 1/2, 5 3/4" str. 93 tons; Consolidated #56-1/2, 6" str. 135 tons.  
SAWS: Marvel #18 Hydr., High Speed, Heavy Duty; Kenlin Model K Cutoff (Wood).  
SHAPERS: Gould & Eberhardt 24" High Duty.  
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|--|---|---|---|
| <b>A</b><br>*Accurate Perforating Co. .... 171<br>Allis-Chalmers Mfg. Co.<br>Engine-Material Handling Div. 105<br>*Aluminum Co. of America 100 & 101<br>American Brass Co., The ..... 92<br>American Gas Association ..... 28<br>American Steel Warehouse Association<br>..... 130<br>American Steel & Wire Div.,<br>United States Steel Corp.<br>137, 138, 139 & 140<br>*Armstrong-Blum Manufacturing<br>Co. .... 94<br>*Avondale Marine Ways, Inc.<br>Service Foundry Div. .... 16 | *Cleveland Worm & Gear Co. .... 70<br>Columbia-Geneva Steel Div.,<br>United States Steel Corp.<br>137, 138, 139 & 140<br>*Columbia-Southern Chemical<br>Corp. .... 151<br>*Commonwealth of Pa.<br>Dept. of Commerce ..... 126<br>Consumers Steel & Supply Com-<br>pany ..... 169<br>Copperweld Steel Company Su-<br>perior Steel Division ..... 133<br>*Cromwell Paper Co. .... 84<br>Crucible Steel Co. of America... 27<br>Curry, Albert & Co., Inc. .... 167 | <b>G</b><br>General Dynamics Corp., Liquid<br>Carbonic Div. .... 21<br>*General Electric Co. .... 22, 23<br>*General Electric Co., Apparatus<br>Dept. .... 172<br>*General Electric Co., Computer<br>Dept. .... 81<br>*Gisholt Machine Co. .... 62<br>Goss & DeLeeuw Machine Co. .... 171<br>*Gulf Oil Corp. .... 48 & 49   | <b>F</b><br>*Pacific Industrial Manufacturing<br>Company ..... 102 & 103<br>Pittsburgh Steel Co. .... 50 & 51<br>Platt Bros. & Co., The ..... 171<br><br><b>Q</b><br>Quaker State Metals Co. .... 155   |
| <b>B</b><br>*Babcock & Wilcox Co., The<br>Refractories Division ..... 165<br>Baldwin-Lima-Hamilton Corp.,<br>Standard Steel Works Div. .... 44<br>Baron Iron & Equipment Co. .... 169<br>Bay State Abrasive Products Co.<br>..... 46 & 47<br>Belyea Co., Inc. .... 167<br>Berlin, M. R., Company ..... 169<br>*Bethlehem Steel Co. I, 17, 18, 19 & 20<br>Bliss & Laughlin, Inc. .... 56 & 57<br>Bullard Co., The ..... 129   | <b>D</b><br>*DeLaval Steam Turbine Co. .... 39<br>*Dow Chemical Company<br>106, 107 & 108<br><br><b>E</b><br>Eastern Machinery Co., The ..... 167<br>Eastern Stainless Steel Corp. 40 & 41<br>*Elmco Corporation, The ..... 97<br>Electric Furnace Co. .... 82<br>*Erie Foundry Co. .... 4  | <b>H</b><br>Harris Foundry & Machine Com-<br>pany ..... 90<br>Hartford Machine Screw Company 134<br>Haynes Stellite Company Division<br>of Union Carbide Corp. .... 45<br>Henry, A. T. & Company, Inc. .... 167<br>Helt Constructors, Inc. .... 168<br>*Hooker Chemical Corporation... 168<br>Hubbard & Company ..... 169<br>Hughes, Arnold Co. .... 168 & 169<br>Hyman, Joseph & Sons ..... 168  | <b>R</b><br>*Reynolds Metals Co. .... 14<br>*Rhode Island Tool Co. .... 163<br><br><b>S</b><br>*Selas Corp. of America ..... 144<br>*Service Foundry Division of Avon-<br>dale Marine Ways, Inc. .... 16<br>*Sharon Steel Corp. .... 6<br>Signode Steel Strapping Co. .... 10<br>*Simonds Gear & Manufacturing<br>Co., The ..... 101<br>*Southern Screw Co. .... 11<br>Standard Oil Co. (Indiana) .... 67<br>Standard Screw Company ..... 134<br>*Standard Steel Works Div., The<br>Baldwin-Lima-Hamilton Corp. .... 44<br>*Stromberg-Carlson Electronic<br>Control Systems Division of<br>General Dynamics Corporation 33<br>Sun Shipbuilding & Dry Dock Co. 170<br>Superior Steel Division of Copper-<br>weld Steel Company ..... 133   |
| <b>C</b><br>Carpenter Steel Co., The ..... 125<br>Century Electric Company ..... 52 & 53<br>Chicago Screw Company, The ..... 134<br>*Clark Controller Co. .... 5<br>*Clark Equipment Co. Industrial<br>Truck Division ..... 61   | <b>F</b><br>Fabrikant Steel Products, Inc. .... 168<br>Falk Machinery Co. .... 167<br>*Feller Engineering Co. .... 31<br>*Foote Mineral Co. .... 99<br>Formed Steel Tube Institute ..... 89<br>Foster, Frank B. Inc. .... 168<br>*Foster, L. B. Company ..... 15  | <b>I</b><br>Inland Steel Co. .... 68<br>*International Nickel Co., Inc.,<br>The ..... 143<br>Iron & Steel Products, Inc. .... 166<br><br><b>J</b><br>*Jomac, Inc. .... 13   | <b>T</b><br>*Techline Division of Wheelabra-<br>tor Corp. .... 66<br>Tennessee Coal & Iron Div.,<br>United States Steel Corp.<br>137, 138, 139 & 140<br>Timken Roller Bearing Co., The<br>..... 58 & 59<br>*Towmotor Corporation ..... 147  |
| <div> <h1>MACHINE<br/>WORK &amp;<br/>SPECIAL<br/>MACHINE<br/>BUILDING</h1> </div> <div> <p>We have large, medium and small machine tools available for machine work and the building of special machinery.</p> <p>We will be pleased to receive your inquiries.</p> </div> <div> <h2>SUN SHIP</h2> <p>BUILDING &amp; DRYDOCK COMPANY<br/>CHESTER, PA.</p> </div>                           |   | <b>K</b><br>*Kaiser Aluminum & Chemical<br>Sales Inc. Kaiser Chemicals<br>Division ..... 54 & 55<br>Kaiser Engineers ..... 30<br>Kingsbury Machine Tool Corp. .... 12<br><br><b>L</b><br>Lang Machinery Co., Inc. .... 169<br>Levinson Steel Co., The ..... 104<br>*Lilly Eli & Company ..... 32<br>*Link-Belt Co. .... 86<br>*Lodge & Shipley Co. .... 38<br>Luria Bros. & Co., Inc. .... 153<br>Lyndhurst Steel Corp. .... 169<br><br><b>M</b><br>McLouth Steel Corp. .... 65<br>MacCabe, T. B., Co. .... 166<br>MacWhyte Company ..... 171<br>*Magnus Chemical Company, Inc. 132<br>Manning, Maxwell & Moore, Inc. 131<br>Mesta Machine Co.<br>Inside Front Cover<br>Metallurgical Products Depart-<br>ment of General Electric Com-<br>pany ..... 36 & 37<br>Miles Machinery Co. .... 169<br>Monarch Machine Tool Co. .... 43<br>Murphy Machinery, Inc. .... 169<br><br><b>N</b><br>*National Automatic Tool Co.<br>Inc. .... 25 & 26<br>National Machinery Exchange ..... 167<br>*National-Standard Co. .... 34 & 35<br>*National Steel Corp. .... 127<br>National Tube Div. United States<br>Steel Corp. .... 137, 138, 139 & 140<br>*New Departure Div., General<br>Motors Corp. .... 8<br>*Norton Company, Abrasive<br>Grain Div. .... 29 | <b>U</b><br>*Uddeholm Company of America,<br>Inc. .... 24<br>Ulbrich Stainless Steels ..... 149<br>Union Carbide Corp.<br>Haynes Stellite Division ..... 45<br>*United States Steel Corp.<br>137, 138, 139 & 140<br>United States Steel Export Co.<br>137, 138, 139 & 140<br>United States Steel Supply-Steel<br>Service Centers Div. United<br>States Steel Corp. .... 137, 138, 139 & 140<br>*Universal-Cyclops Steel Corpora-<br>tion ..... 60<br><br><b>V</b><br>*Verson Allsteel Press Co. Back Cover<br><br><b>W</b><br>*Wagner Electric Corp. .... 63 & 64<br>Wallack Bros. .... 169<br>*Weirton Steel Co. .... 127<br>Weiss Steel Co., Inc. .... 169<br>Western Automatic Machine<br>Screw Company, The ..... 134<br>*Wheelabrator Corporation ..... 66<br>Wilson, Lee, Engineering Co., Inc.<br>Inside Back Cover<br>Wyckoff Steel Co. .... 128<br><br><b>CLASSIFIED SECTION</b><br>Clearing House ..... 166-167<br>Contract Manufacturing Appears<br>in first and third issue of each<br>month. See April 2 & April 16<br>Employment Exchange ..... 169<br>Equipment & Materials Wanted.. 169 |



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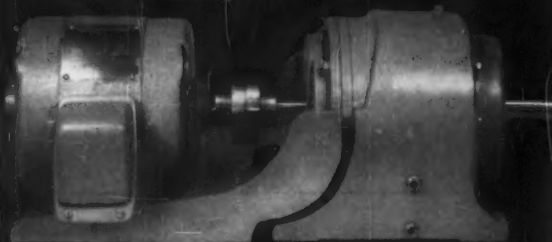
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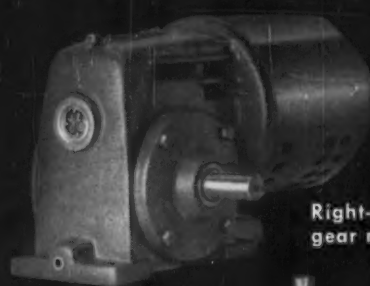
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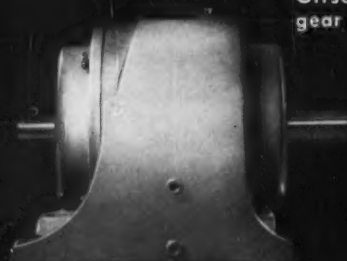
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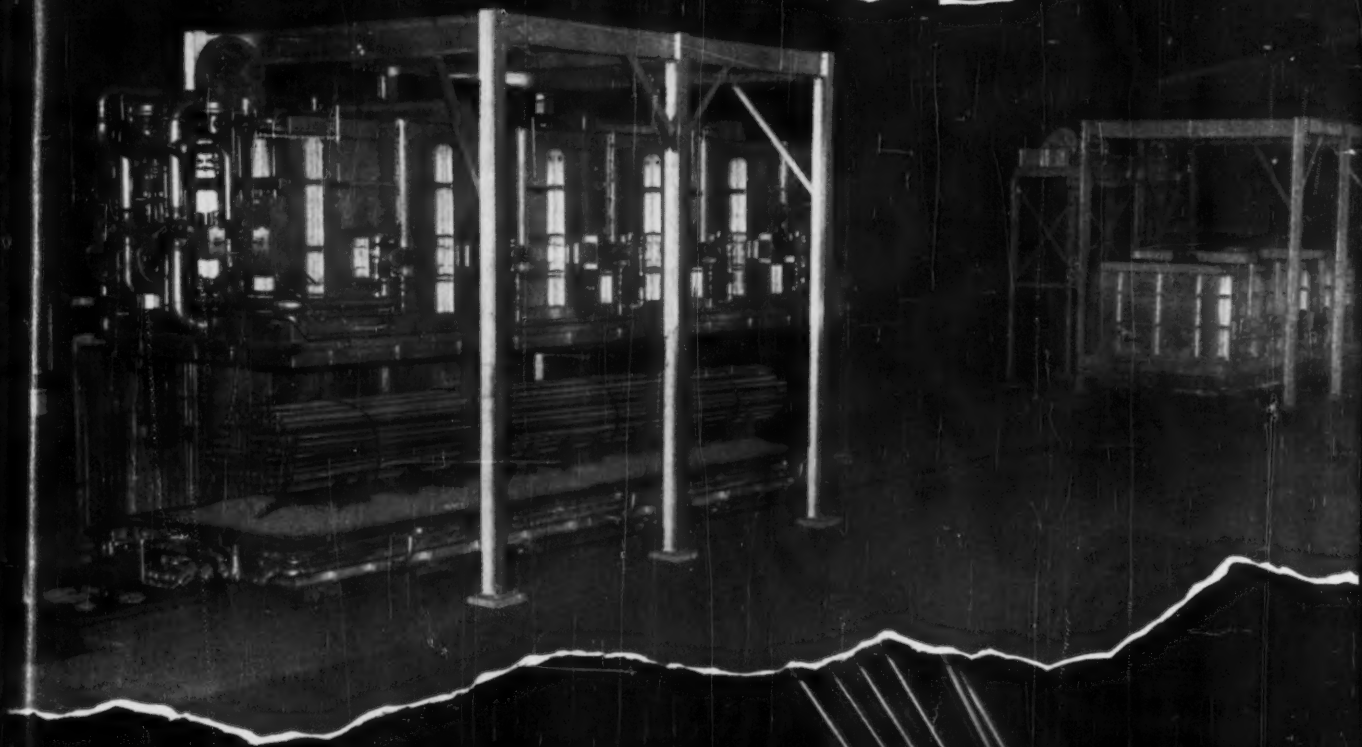
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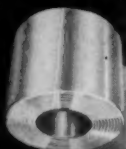


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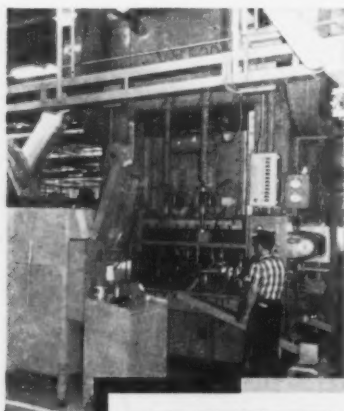
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